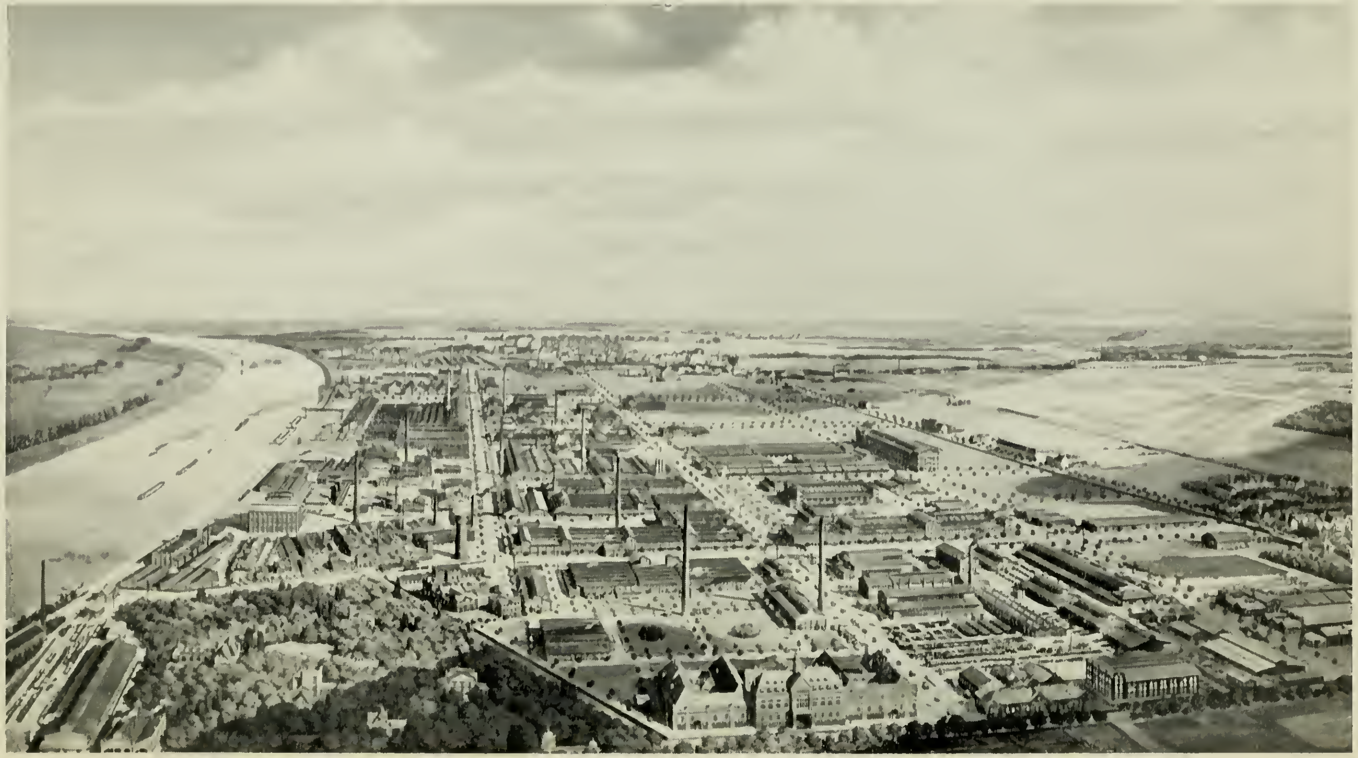
FARBENFABRIKEN
vorm. FRIEDR. BAYER & Co.
ELBERFELD

GARMENT DYEING

Nc05

1.25

PB



Farbenfabriken vorm. Friedr. Bayer & Co., Leverkusen near Cologne on the Rhine.

FARBENFABRIKEN

VORM.

FRIEDR. BAYER & Co.

LEVERKUSEN,
near Cologne on the Rhine.

Farbenfabriken of Elberfeld Co.
117 Hudson Street . . . . NEW YORK.
32 India Street . . . . BOSTON Mass.
56 Pine Street . . . . PROVIDENCE R. I.
9—11 N. Water Street . . . . PHILADELPHIA Pa.
146 West Kinzie Street . . . . CHICAGO Ill.
14 Front Street East . . . . TORONTO, Ont. (Canada).

Garment Dyeing.

No. 1919. 1912.

Preface.

Our last brochure on Garment Dyeing, which met with a good reception everywhere, is now out of print, so that we have been compelled to issue a new edition in order to meet the great demand.

Needless to say, in the present work, we take into account the progress made during the last few years and not only acquaint our readers with the latest colours and methods but also deal with the dyeing of materials which have recently come into prominence.

As far as possible, we only furnish recipes which have given good results in practice. We therefore have reason to believe that the new publication will render good service and help to increase the popularity of our colours.

May 1912.

Farbenfabriken vorm. Friedr. Bayer & Co.

Digitized by the Internet Archive
in 2010 with funding from
NCSU Libraries

http://www.archive.org/details/garmentdyein00farb

Table of Contents.

Page
Preliminary Treatment of the Goods 1
Stripping Process 1
Bleaching 3

I. The Dyeing of Wool.

Dyeing in Strongly Acid Baths 7
Dyeing in Weakly Acid Baths 13
Dyeing with Basic Colours 14
Dyeing with Mordant Colours on a Chrome Mordant 15
Dyeing with Mordant Colours according to the Afterchroming Method 16
Dyeing with Monochrome Colours 17
Combinations of Acid-dyeing Colours 18
Re-dyeing of Coloured (Unstripped) Garments 19
Dyeing of Faded Material 20

II. The Dyeing of Cotton.

Dyeing with Benzo Colours 24
Aftertreatment of the Benzo Colours 24
Dyeing of Bright Shades in One Bath 27
Dyeing with Diazo Colours 28
Dyeing with Katigen Colours 30
Dyeing with Basic Colours 32

III. The Dyeing of Half-wool.

Dyeing with Benzo and Neutral-dyeing Wool Colours 37
Benzo Colours chiefly used for subsequently covering the Cotton 40
Acid Colours which are absorbed by Wool in a Neutral Bath and are therefore serviceable for shading this Fibre 42
First dyeing the Wool and then covering the Cotton 44
First dyeing the Cotton and then cross-dyeing the Wool . . 45
Combination Shades 47
Chrome Process for Half-wool 47
Two-coloured Effects 50
Dyeing of Faded Material 51

IV. The Dyeing of Silk. Page
Dyeing with Acid Colours 55
Dyeing with Weakly Acid or Sulphon Colours 56
Dyeing with Benzo Colours which are dyed Direct or Diazotised and Developed 57
Dyeing with Basic Colours 58
Combination Shades 59
Dyeing with Mordant Colours 59

V. The Dyeing of Half-silk.
Dyeing with Benzo Colours 65
Dyeing with Benzo Colours which leave the Silk perfectly white or almost white 66
Dyeing with Acid Colours which only dye the Silk 67
Two-coloured Effects 68

VI. The Dyeing of Wool-silk.
Dyeing with Acid and Weakly Acid Colours which cover both Fibres uniformly 73
Dyeing with Benzo Colours which cover both Fibres uniformly 74
Dyeing with Acid and Mordant Colours which leave the Silk white 75
Two-coloured Effects 76

VII. The Dyeing of Fabrics consisting of Wool, Silk and Cotton.
Uniform (Solid) Shades 81

VIII. The Dyeing of Woollen Material containing Glanzstoff Effects.
Uniform (Solid) Shades 85
White and Coloured Glanzstoff Effects 86

IX. The Dyeing of Cotton Material containing Artificial Silk Effects.
Cotton Material with Glanzstoff Effects 89
Cotton Material with Chardonnet Silk Effects 90

X. The Dyeing of Half-woollen Material containing Artificial Silk Effects 93

XI. The Dyeing of Artificial Silk.
Glanzstoff, Viscose and Chardonnet Silk 96

XII. The Dyeing of Straw 101
XIII. The Dyeing of Chip Plait 102
XIV. The Dyeing of Jute 103
XV. The Dyeing of Linen, Half-linen and Ramie (China Grass) 104
XVI. The Dyeing of Feathers 104

Preliminary Treatment of the Goods.

The cleaner the goods, the better the results obtained on dyeing. It is therefore advisable in many cases to subject the goods to a thorough cleaning before dyeing.

Removal of Stains.

Stains are removed, according to their nature, by the use of soap, Tetrapol, carbon tetrachloride, turpentine, benzine, ether, oxalic acid etc.

Wool and Half-wool.

In many cases, these materials are sufficiently scoured by treating in a warm bath containing soda or ammonia, Tetrapol or soap being added if necessary.

Cotton.

In most cases, it is merely necessary to boil the material in a soda bath.

Silk, Half-silk and Wool-silk.

The boiling or stripping is carried out in a hot, weak bath containing soda or ammonia, or in a strong, boiling-hot soap bath.

Stripping Process.

Stripping of Woollen and Half-woollen Goods.

The following processes are generally resorted to:

1. Soda or ammonia.

Prepare a warm bath (100—120° Faht.) with

5—10% soda ash

or an equal amount of ammonia, soak the material in it for 20—30 minutes and then rinse well.

2. Sulphuric acid and Glauber's salt.

Some colours may be stripped by boiling in a bath containing
5 — 10% sulphuric acid and
10 — 20% Glauber's salt cryst.

3. Bichrome and sulphuric or oxalic acid.

Prepare the bath with
3 — 6% bichrome
5 — 10% sulphuric acid or
3 — 6% oxalic acid
and treat for 20—30 minutes at the boil.

This method is employed for mordant colours and wood extracts.

4. Rongalite C.

After treating the material according to Process 1, add to a fresh bath
2 —3 % Rongalite C
4 —6 % acetic acid 30% or
1.5—2.5% formic acid,
enter the material lukewarm, raise slowly to the boil and boil for $^1/_2$ hour; afterwards rinse well.

5. Decroline.

Prepare the bath with
3 — 5% decroline and
3 — 5% sulphuric acid, calculated on the weight of the goods, enter the material, which has been previously scoured in a soda bath, at 100—120° Faht., bring to the boil and work for 20—30 minutes. Formic or acetic acid may be used instead of sulphuric acid. Care must be taken that the bath remains acid all the time; a little more sulphuric acid may be subsequently added, if necessary.

Since the different colours behave in a different way during the stripping process, it is advisable to determine beforehand by stripping small trial lots which process yields the best result.

Stripping of Cotton Goods.

Treat for $^3/_4$—1 hour in a bath containing 8 oz. soda per 10 imp. gallons water and then in a weak bath prepared with chloride of lime (See Bleaching of Cotton); rinse and acidulate.

Bleaching.

The bleaching process is most suitably carried out in wooden or earthenware vessels; metal parts should be avoided.

The Bleaching of Wool, Half-wool, Silk and Half-silk.

The most permanent white is obtained with hydrogen peroxide or sodium peroxide.

1. Take 1 part hydrogen peroxide and about 5 parts cold water and add sufficient ammonia or silicate of soda to make the bleaching bath slightly alkaline. Then enter the material, work it a little, warm slowly up to 110—120^0 Faht. and allow to lie in the liquor overnight, completely immersed.

After bleaching, acidulate in a cold bath with 2—5% sulphuric acid (calculated on the weight of the material) and then rinse.

2. Prepare the bleaching bath with

1 oz. sulphuric acid 168^0 Tw.

per gallon liquor and slowly add, whilst constantly stirring,

$^4/_5$ oz. sodium peroxide.

Afterwards add sufficient ammonia or silicate of soda to make the bath slightly alkaline and proceed as stated in Recipe I.

3. Potassium permanganate. Add a solution of

2% potassium permanganate (of the weight of the goods)

to a short, cold bath. Enter the material (which is still damp) and work for $^1/_2$—1 hour. After sufficient manganese dioxide has been formed on the fibre, enter into a fresh, cold bath to which

6% sodium bisulphite

is added; treat for $^1/_2$ hour, add

1% sulphuric acid,

work again for about $^1/_2$ hour i. e. until the material is perfectly white, and rinse.

4. Stoving. Scour the goods well with soap, hydroextract and, in the damp state, hang up in the stoving chamber for several hours or, better still, overnight. There must be a sufficiently strong current of air to ensure a ready combustion of the sulphur and to avoid the formation of a sulphur deposit. After stoving, rinse the goods well in water.

Instead of resorting to the stoving chamber, solutions of sulphurous acid may be employed.

Bleaching of Cotton.

Cotton is generally bleached in a solution of bleaching powder (chloride of lime) $1^1/_2{}^0$ Tw. Treat the cotton (which has been previously scoured) for some time in the cold bleaching bath and then allow to lie in the bath for several hours or, better still, overnight. Afterwards acidulate with sulphuric acid (about 1 lb. per 20 gallons water) and rinse. If the material is not sufficiently bleached, repeat the process, using a weaker solution of chloride of lime.

Bluing.

After bleaching, blue the material in a cold bath with, say, Alizarine Sky Blue B and Alizarine Irisole R. These colours are the best as regards fastness to light and are vastly superior to the colours formerly in general use for bluing, viz: Indigo Carmine and Methyl Violet.

I. The Dyeing of Wool.

The Dyeing of Wool.

a) Dyeing in Strongly Acid Baths.

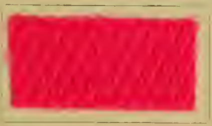
The colours which are dyed in strongly acid baths are generally employed for ladies' dress material, furniture cloth, door curtains, blankets etc. Several of these colours are also used for re-dyeing boys' and men's cheap suitings, on account of their very good fastness to light and good fastness to wear.

Dye with an addition of 10—15% Glauber's salt cryst. and 2—5% sulphuric acid or with 5—15% bisulphate of soda, enter at 140—160° Faht., raise slowly to the boil and boil for $^3/_4$—1 hour.

(When it is advisable to dye according to another recipe, the recipe will be given in its proper place.)

Goods containing cotton effect threads are covered in a fresh, lukewarm bath with Benzo colours. (See "The Dyeing of Halfwool", b.)

1

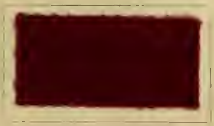


1% Rhodamine B

2

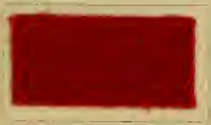
1% Alizarine Rubinole R

3



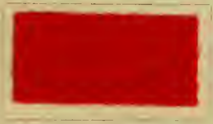
2% Azo Fuchsine 6 B

4



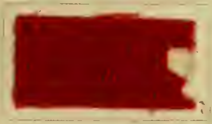
2% Azo Fuchsine G

5



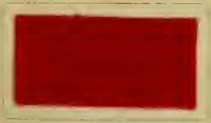
1,5% Azo Fuchsine 4 G extra

6

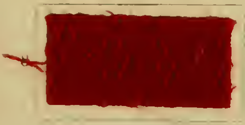


2% Azo Crimson S

7



3% Fast Red V R



3% Fast Red A

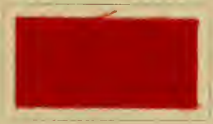
9

3% Croceine Scarlet L C

10

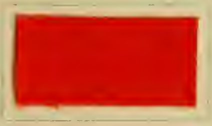
3% Croceine Scarlet 3 B X

11



3% Fast Ponceau L

12



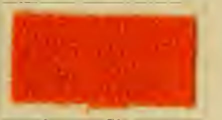
4% Supramine Red 2 G

Rhodamine B (combined if necessary with Quinoline Yellow) is employed for the production of delicate pink and salmon shades; it yields the clearest results when dyed at a temperature of 195—200° Faht. Alizarine Rubinole R, Azo Fuchsine 6B, G, 4G extra, Azo Crimson S and Supramine Red 2G are the fastest to light of the red level-dyeing colours which are very suitable for shading and which may be added even to the boiling bath.

As regards fastness to light, the best brands are Alizarine Rubinole R, and Alizarine Rubinole GW, 3G & 5G (which are not illustrated). The Alizarine Rubinoles and Supramine Red 2G are also fast to washing. Alizarine Rubinole 3G and 5G are especially suitable for strawberry or pronounced red shades.

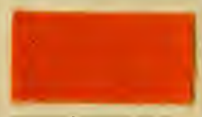
The other red colours level well in full shades and are serviceable for scarlets and clarets. Croceine Scarlet LC and Fast Ponceau L are particularly fast to light.

13



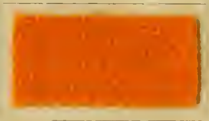
2% Orange II B

14



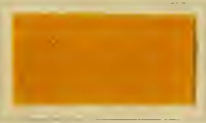
2% Croceine Orange G

15



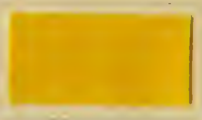
2% Fast Light Orange G

16



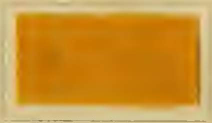
2% Indian Yellow G

17



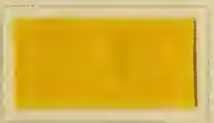
2% Tartrazine

18



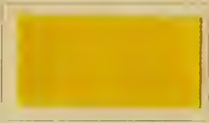
3% Supramine Yellow G

19



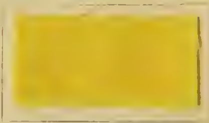
2% Fast Light Yellow G

20



2% Naphtol Yellow S

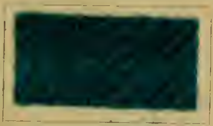
21

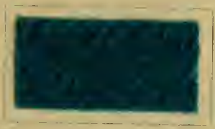


0,75% Quinoline Yellow KT extra conc.

Fast Light Orange G is a useful colour where special importance is attached to good fastness to light and good level-dyeing property. Orange II B and Croceine Orange G are esteemed on account of their great productiveness.

The Fast Light Yellow brands and Supramine Yellow G possess specially good fastness to light, whilst Tartrazine is almost as good in this respect. Supramine Yellow G is also fast to water and washing and comes into consideration for the dyeing of bunting etc. Quinoline Yellow KT extra conc. is a very productive colour and, like the other Quinoline Yellow brands, is in great favour owing to its clear, greenish yellow shade. All the yellow brands illustrated here may be employed as combination (level-dyeing) colours for fashion shades etc. Tartrazine is serviceable as a yellow constituent colour for dark shades; the same remark also applies to Indian Yellow G, a cheap and very productive brand. Naphtol Yellow S is the cheapest yellow, but is inferior to the others in fastness to light.

22

2% Alkali Fast Green 3G

23

2% Acid Green GG extra

24

2% Brilliant Acid Green 6B

25

2% Fast Light Green

26

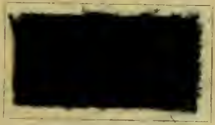
2% Fast Green extra bluish

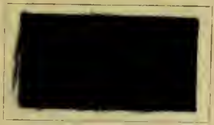
27

2% Wool Green BS

28

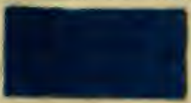
3% Anthracyanine Green BL

29

3% Anthracyanine Green 3GL

30

3% Cashmere Green B

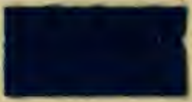
Alkali Fast Green 3G, as its name implies, is fast to alkali. Brilliant Acid Green 6B is especially valuable on account of its good fastness to washing. Fast Light Green and Wool Green BS are faster to light than the remaining bright green brands; like Fast Green extra bluish and Acid Green GG extra, they are generally used in combination with Acid Violets or Victoria Fast Violets etc. for the production of cheap navy blues. The Anthracyanine Greens are especially remarkable for their very good fastness to light which is considerably better than that of all other acid-dyeing greens; they also dye very easily level, so that they are employed not only for dark green shades but also for reseda etc. Cashmere Green B has great covering power, levels well and is especially serviceable for Russian greens.

31



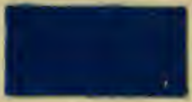
2% Brilliant Acid Blue A

32



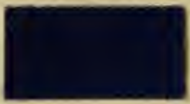
2% Brilliant Acid Blue FF

33



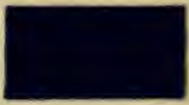
2% Brilliant Acid Blue B

34



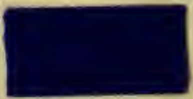
2% Alizarine Astrole B

35



2% Alizarine Sapphirole B

36

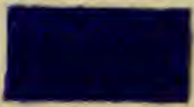


2% Brilliant Wool Blue B extra

37

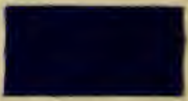
2% Brilliant Wool Blue G extra

38



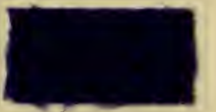
2% Brilliant Wool Blue FFR extra

39



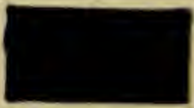
2% Wool Blue N extra

40



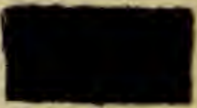
2% Wool Fast Blue BL

41



3% Victoria Navy Blue LH

42

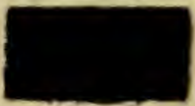


3% Victoria Navy Blue B

43

3% Anthra Cyanine RL

44



3% Fast Acid Cyanine GR

45

3% Fast Acid Cyanine 5R

The Brilliant Acid Blues are distinguished by great clearness of shade and good level-dyeing property, the A and B qualities also possessing good fastness to washing. In addition to the other purposes for which they are employed, these latter brands are used in small quantities for shading or brightening navy blues on men's suitings.

Alizarine Astrole B, Alizarine Sapphirole B & SE possess excellent fastness to light; the Anthra Cyanines and Wool Fast Blue BL and GL are scarcely inferior in this respect.

When dyeing the Wool Fast Blues, it is best to start with an addition of Glauber's salt and acetic acid and, after working for 3/4 hour, to add acetic or sulphuric acid or bisulphate of soda.

All the above colours, with the exception of the Anthra Cyanines, are fast to washing. Alizarine Astrole B, Alizarine Sapphirole B and SE are especially valuable as combination colours for the production of fashion shades, fast to light, on ladies' dress material and men's suitings; Wool Fast Blue BL and GL are useful for navy blues. The Anthra Cyanines level well and are employed for medium blues and fashion shades, fast to light.

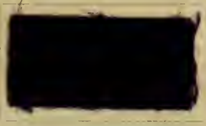
The Brilliant Wool Blues yield very clear blues of good fastness to washing. Wool Blue N extra is not so clear in shade as the Brilliant Wool Blues, but is likewise fast to washing.

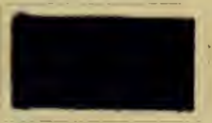
Victoria Navy Blue B and LH are employed for re-dyeing ladies' dress material a navy blue or dark blue. The LH is superior to the B brand in fastness to light; the DK quality is very fast to steaming.

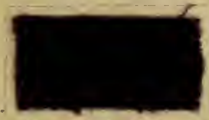
Fast Acid Cyanine GR and 5R level well in dark shades and are serviceable, in the first place, for dyeing cheap dresses, in the second place, for men's and boys' cheap suitings, in cases where such fastness as the Sulphon Cyanines or mordant colours possess is not demanded.

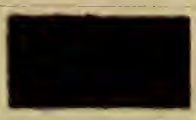
46

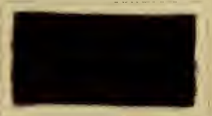
2% Fast Acid Violet 10B

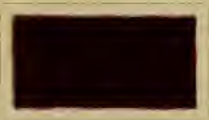
47

2% Acid Violet 4B extra

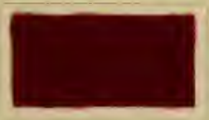
48

2% Anthracyanine Violet 3 B

49

2% Victoria Violet 4BS

50

2% Victoria Fast Violet B extra

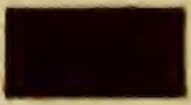
51

2% Victoria Fast Violet 2 R extra

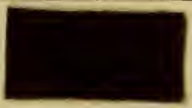
52

2% Azo Acid Violet A 2B

53

2% Azo Acid Violet 4R

Anthracyanine Violet 3B is distinguished both by very good fastness to light and by good level-dyeing property. The Azo Acid Violet and Victoria Fast Violet brands are considerably faster to light than Fast Acid Violet 10B, Acid Violet 4B extra and Victoria Violet 4BS; moreover, the Victoria Fast Violets are much faster to alkali than Victoria Violet 4 BS.

All the violet brands dye easily level and have been found serviceable as combination colours in the production of navy or dark blues; Fast Acid Violet 10 B, owing to its excellent level-dyeing property, is also used for shading fashion shades and Anthracyanine Violet 3 B for lilac and fashion shades etc., fast to light.

54

3% Anthracyanine Brown
R L

55

3% Anthracyanine Brown
G L

Both the above colours possess very good level-dyeing property and very good fastness to light. On account of the fact that they level well, they are the first acid-dyeing browns to be chiefly employed for dyeing fashion shades on ladies' dress material.

56

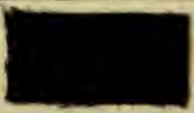
5% Cashmere Black
3 B N

57

5% Cashmere Black V

58

5% Naphtylamine Black
4 B

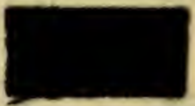
59

5% Naphtylamine Black
C S B

60

5% Naphtylamine Black
F

61

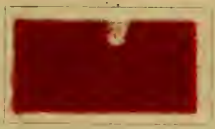
5% Naphtylamine Black
S

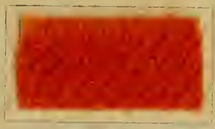
62

5% Victoria Black B

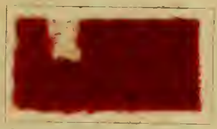
As a rule, Cashmere Black 3 B N and V come into consideration only for lighter qualities of ladies' dress material which are dyed in a strongly acid bath; they level well. The Naphtylamine Black brands are resorted to for heavier qualities of ladies' dress material and cheap suitings. The C S B brand can be dyed with sulphuric acid, whilst for the others, it is better to begin with acetic acid and afterwards to add, if necessary, a little sulphuric acid or bisulphate of soda. Victoria Black B possesses good fastness to light and washing; the Naphtylamine and Cashmere Blacks meet ordinary demands in this respect.

b) Dyeing in Weakly Acid Baths.

Dye with an addition of 10—20% Glauber's salt cryst. and 2—3% acetic acid, enter at about 140^0 Faht., bring slowly to the boil, boil $^3/_4$—1 hour and, if the bath does not exhaust, add 2% acetic acid again.

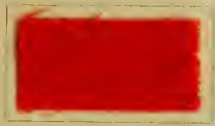
63

2% Cloth Red B C

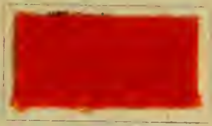
64

2% Cloth Red 3 G extra

65

2% Benzo Fast Red F C

66

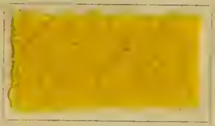
2% Acid Anthracene Red 5 B L

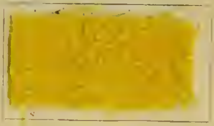
67

2% Acid Anthracene Red G

68

2% Congo Orange R

69

2% Sulphon Orange G

70

1,25% Sulphon Yellow R

71

1,25% Sulphon Yellow 5 G

Of the above colours, the fastest to light are Benzo Fast Red F C, Acid Anthracene Red 5 B L, Sulphon Yellow R and 5 G.

The red colours are all fast to washing even in direct shades, but an aftertreatment with bichrome or fluoride of chrome renders them still faster; for Acid Anthracene Red 5 B L and Benzo Fast Red F C, it is advisable to employ fluoride of chrome.

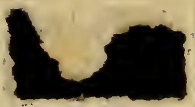
The aftertreatment is carried out as follows: When the bath is exhausted, add half as much bichrome or the same amount of fluoride of chrome as colour taken, and work at the boil for $^1/_2$ hour. The aftertreatment may also be carried out in a fresh bath, but in this case a little acetic acid must be added.

The orange and yellow colours possess good fastness to washing when dyed direct.

Acid Anthracene Red 5 B L and the Sulphon Yellow brands, owing to their fastness to water, are very well adapted for bunting.

72

1,5% Sulphon Cyanine
G R extra

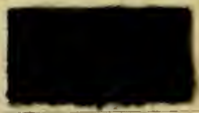
73

1,5% Sulphon Cyanine
5 R extra

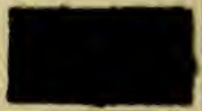
Sulphon Cyanines. Dye with an addition of 3—5% acetate of ammonia and 10—15% Glauber's salt cryst., enter at a low temperature, raise slowly to the boil and keep boiling gently; if the bath does not exhaust sufficiently, add a little more acetic acid.

Sulphon Cyanine GR extra & 5R extra are distinguished by very good fastness to light, washing, and wear. They are frequently employed for re-dyeing suitings.

74

5% Sulphon Cyanine
Black 4 B

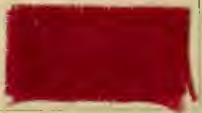
75

5% Sulphon Cyanine
Black 8 B

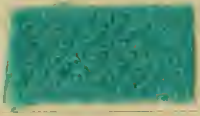
76

5% Sulphon Cyanine
Black B R

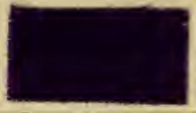
The Sulphon Cyanine Blacks are also very fast to light, washing and wear, and are used for the same purposes as the Sulphon Cyanines.

c) Dyeing with Basic Colours.

Dye with an addition of 10% Glauber's salt cryst. and, according to the hardness of the water, 1—5% acetic acid.

77

1% Diamond Fuchsine
cryst.

78

2% Brilliant Green cryst.

79

1% Crystal Violet P

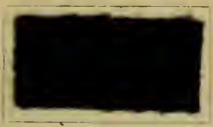
The basic colours are now seldom used for dyeing wool, but they still serve to produce very clear crimson, green and violet shades and to top-dye or brighten acid colours.

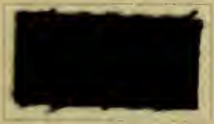
d) Dyeing with Mordant Colours on a Chrome Mordant.

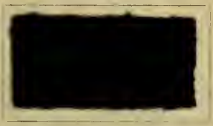
Mordant, according to the depth of the required shade, with 1—4% bichrome and 0.75—3.5% tartar; enter the goods at the boil and boil for 1—2 hours. After mordanting, rinse.

Instead of tartar, other assistants, such as formic acid, lactic acid, lactoline etc. may be employed.

Dye with an addition of 2—5% acetic acid, enter at about 105° Faht., raise slowly to the boil and boil for 1—2 hours. In many cases, it is advisable to add some acetic acid again, in order to exhaust the bath better. When dyeing light shades (fashion shades), it is advantageous to add 10—15% Glauber's salt cryst. as it furthers the level-dyeing.

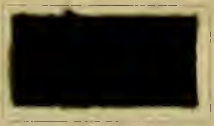
80

Chrome Mordant
3,25% Brilliant Alizarine Cyanine 3 G

81

Chrome Mordant
3% Alizarine Cyanine N S

82

Chrome Mordant
1,75% Chrome Cyanine R
1,75% Chrome Cyanine G

83

Chrome Mordant
3 % Alizarine Cyanine Green K
0,75% Chrome Cyanine T
1 % Chrome Yellow D F

84

Chrome Mordant
1,25% Anthracene Brown W
0,75% Alizarine Cyanine Green 3 G
0,75% Diamond Flavine G

85

Chrome Mordant
3 % Anthracene Brown W
0,5 % Chrome Yellow DF
0,55% Alizarine Blue Black B

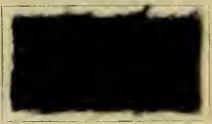
All the above colours or combinations are fast to washing, light, wear and perspiration and are employed almost exclusively for dyeing better-class suitings and uniforms. Brilliant Alizarine Cyanine and Alizarine Cyanine yield the fastest blues; Chrome Cyanine comes next. Alizarine Cyanine Green E, G extra, 3 G and K yield exceedingly fast green shades. Alizarine Blue Black B is universally known; it possesses excellent fastness and, of all the above colours, has the best level-dyeing property.

e) Dyeing with Mordant Colours according to the Afterchroming Method.

Dye with an addition of 10% Glauber's salt cryst., and 2—4% acetic acid. 0,5% Monopole soap may also be added. Enter at 105—120° Faht. (in the case of Acid Chrome Blue FFB and FFR, the temperature must be at least 160° Faht.), raise slowly to the boil, boil for 3/4—1 hour, add 0.5—2% sulphuric acid and continue boiling for 3/4 hour. Afterwards turn off steam and cool down with cold water, add bichrome (see recipes for amount) and boil again for 30—45 minutes.

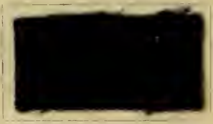
When dyeing Diamond Black PV, P2B and PVT, add 2% acetic acid, enter at 160° Faht., raise to the boil, add 1—2% sulphuric acid after boiling 1/2 hour, continue boiling for 20—30 minutes and then work for 1/2 hour with turned-off steam. Afterwards treat with bichrome as stated above.

86



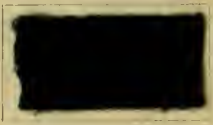
3 % Acid Chrome Blue FFB
1,5% Bichrome

87



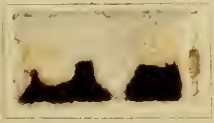
3 % Acid Chrome Blue FFR
1,5% Bichrome

88



2,5 % Alizarine Cyanine Green E
0,75% Chrome Yellow DF
0,5 % Alizarine Blue Black B
1,5 % Bichrome

89



1,5% Acid Anthracene Brown RH extra
1 % Chrome Yellow DF
0,2% Chrome Cyanine T
1,5% Bichrome

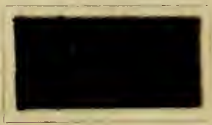
90

1 % Alizarine Blue Black B
0,5% Bichrome

91

4,5 % Diamond Black F
1,25% Bichrome

92



6,5% Diamond Black PV
2 % Bichrome

93

6,5% Diamond Black P2B
2 % Bichrome

94

6,5% Diamond Black PVT
2 % Bichrome

All the above colours or combinations are distinguished by excellent fastness to washing, light, perspiration and atmospheric conditions. The Diamond Black P brands are the best in every respect, including fastness to potting.

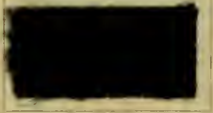
Alizarine Blue Black B levels well and is employed for dyeing fast greys or in combination with Chrome Yellow D F, Diamond Flavine G, Acid Anthracene Brown R H extra etc. for fashion shades.

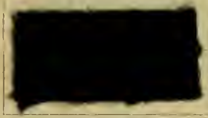
The afterchroming method, described above, is chiefly resorted to when dyeing suitings and uniforms.

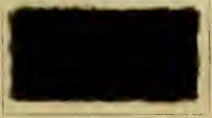
f) Dyeing with Monochrome Colours.

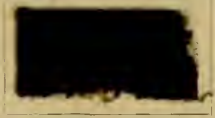
The Monochrome colours are chiefly used for dyeing men's suitings, just like the mordant colours (dyed on a chrome mordant or afterchromed). In the monochrome process, the bichrome is added direct to the dye-bath.

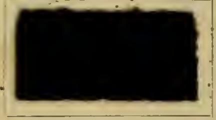
Boil up the colour in the bath, add the amount of bichrome stated in the recipes, enter at 140—160° Faht., raise slowly to the boil, boil $^3/_4$ hour, add 2—3% acetic acid in several portions and continue boiling for 1—$1^1/_2$ hours.

95

4% Monochrome Green B
2% Bichrome

96

3 % Alizarine Cyanine Green E
0,75% Alizarine Blue Black B
0,75% Diamond Flavine G
2 % Bichrome

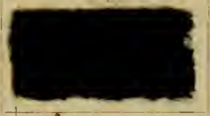
97

0,75% Monochrome Brown V
1,5 % Chrome Yellow DF
0,3 % Monochrome Green B
1,25% Bichrome

98

2% Monochrome Brown B C
1% Bichrome

99

2% Monochrome Brown V
1% Bichrome

100

1 % Monochrome Grey B
0,5% Bichrome

101

5 % Monochrome Black F
1,75% Bichrome

Alizarine Cyanine Green E, Alizarine Blue Black B, Monochrome Green B and Monochrome Brown B C, V possess specially good fastness to light. Monochrome Black F is good in this respect.

All the colours are very fast to washing and wear.

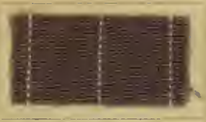
In addition to the colours illustrated above, the following are suitable for the Monochrome process:

Red:	Alizarine Rubinole 3 G, G W, R
	Benzo Fast Red F C
	Cloth Red B, 3 B extra, B C, 3 G extra
Orange:	Chrome Orange G R
Yellow:	Anthracene Yellow C
	Chrome Yellow D, R extra
	Supramine Yellow R
Green:	Alizarine Cyanine Green E, G extra, K
	Brilliant Acid Green 6 B
	Diamond Green S S
	Sulphon Acid Green B, 2 B L
Blue:	Alizarine Astrole B, G
	Alizarine Sky Blue B
	Alizarine Sapphirole B
	Brilliant Acid Blue A
	Monochrome Blue R, 5 R
	Sulphon Cyanine G R extra, G R T extra, 5 R extra, 5 R T extra
	Wool Fast Blue B L, G L
Violet:	Acid Chrome Violet B
	Acid Violet 4 B extra
	Wool Fast Violet B
Brown:	Monochrome Brown G, 3 G, T paste
	Supramine Brown R
Black:	Alizarine Blue Black 3 B
	Phenyl Blue Black N
	Sulphon Cyanine Black B, 4 B, 8 B, B R.

g) Combinations of Acid-dyeing Colours.

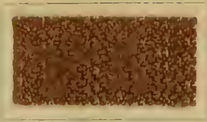
Only a few useful combinations are shown here. These combinations leave white cotton effects clean. Dye with an addition of 10–15% Glauber's salt cryst. and 3–5% sulphuric acid.

102



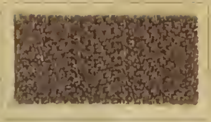
0,18% Anthracyanine
Violet 3 B
0,02% Fast Light Orange
G

103



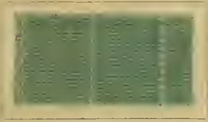
0,25 % Anthracyanine
Brown G L
0,04 % Fast Light Yellow
G
0,025% Azo Fuchsine 6 B

104



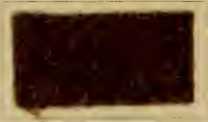
0,085% Alizarine
Sapphirole S E
0,05 % Fast Light Yellow
G
0,02 % Azo Fuchsine 4 G
extra

105



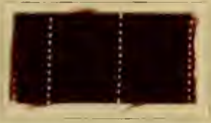
0,06 % Anthracyanine
Green 3 G L
0,015% Anthracyanine
Green B L

106



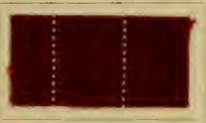
1,75% Anthracyanine
Brown R L
0,5 % Tartrazine
0,04% Anthra Cyanine
R L

107



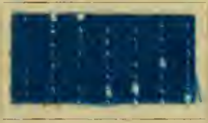
1,5% Azo Fuchsine 6 B
0,5% Orange II B
0,2% Fast Acid Violet 10 B

108



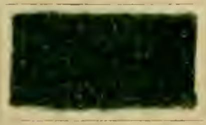
3 % Croceine Scarlet
L C
0,25% Fast Acid Violet
10 B

109



0,5% Brilliant Acid Blue
A
0,2% Fast Acid Violet
10 B

110

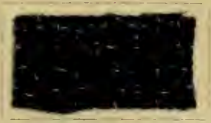


0,6% Brilliant Acid Blue
A
1 % Tartrazine
0,4% Azo Fuchsine 6 B

111

1,25% Victoria Fast
Violet B extra
0,4 % Wool Green B S

112



3% Anthra Cyanine R L
1% Anthracyanine Violet
3 B

h) Re-dyeing of Coloured (Unstripped) Garments.

The shades illustrated were dyed on unstripped grounds, an addition of 10—15% Glauber's salt cryst. and 3—5% sulphuric acid being made to the bath.

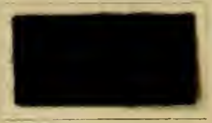
The proportions of colour etc. will, of course, vary according to the ground shade.

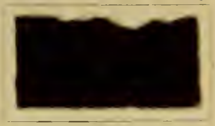
Nos. 114 and 115 were dyed on No. 113. Nos. 117 and 118 on No. 116, and Nos. 120 and 121 on No. 119.

Bottomed with: | Topped with:

113

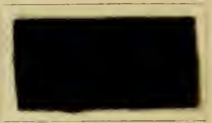
1,7 % Azo Fuchsine 6 B
0,35% Orange II B
0,15% Brilliant Acid Blue F F

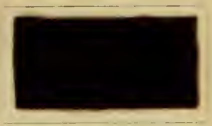
114

0,6% Brilliant Acid Blue F F
0,6% Fast Acid Violet 10 B

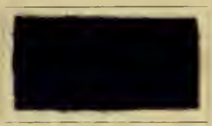
115

1,5% Tartrazine
0,2% Brilliant Acid Blue F F

116

3% Anthracyanine Brown G L
1% Anthracyanine Brown R L

117

0,5% Brilliant Acid Green 6 B
1 % Tartrazine

118

1,5% Croceine Scarlet L C

119

3% Victoria Navy Blue B

120

0,5% Acid Green G G extra
0,5% Tartrazine

121

0,75% Orange II B
1 % Tartrazine

i) The Dyeing of Faded Material.

When dyeing faded material, it is sometimes difficult to obtain level results, as the parts which have been exposed to light most behave differently from those which have faded only slightly or not at all. As a rule, the acid-dyeing colours give even results more readily than the mordant colours.

We herewith append a list of colours which give the most uniform results.

Red:
- Azo Fuchsine G, 4 G extra
- Benzo Fast Red F C
- Croceine Scarlet 3 B X
- Fast Ponceau L
- Fast Red V R
- Acid Anthracene Red G
- Supramine Red 2 G

Orange: Congo Orange G
Fast Light Orange G
Orange II B
Sulphon Orange G

Yellow: Quinoline Yellow K T extra conc.
Fast Light Yellow 2 G, 3 G
Naphtol Yellow S
Tartrazine
Supramine Yellow G
Sulphon Yellow 5 G

Green: Alkali Fast Green 3 G
Brilliant Acid Green 6 B

Blue: Alizarine Sapphirole B
Anthra Cyanine R L
Brilliant Acid Blue F F
Brilliant Wool Blue F F R extra
Victoria Navy Blue L H
Wool Fast Blue B L, G L

Violet: Azo Acid Violet 4 R
Fast Acid Violet 10 B
Acid Violet 4 B extra
Victoria Fast Violet B extra, 2 R extra

Black: Diamond Black F, P V T
Cashmere Black T N, V
Naphtylamine Black 4 B, F
Sulphon Cyanine Black 4 B, 8 B

II. The Dyeing of Cotton.

a) Dyeing with Benzo Colours.

Add to the bath, according to the depth of the required shade, 1—2% soda ash and 20—40% Glauber's salt cryst. (calculated on the weight of the material). In the case of light shades, it is advisable to add 0.5—1% Monopole Soap and to employ the Glauber's salt only after working 15—20 minutes.

(Instead of Glauber's salt cryst., half the amount Glauber's salt calc. or common salt may be used, and instead of 1 part soda ash 2.7 parts soda cryst.)

It is better to dye Brilliant Fast Blue 3 B X and Benzo Bronze G C without soda, whilst in the case of Pluto Black G extra and the other Pluto Black brands, it is advisable to employ a little more soda than is stated in the above recipe.

Enter the goods at 120° Faht., raise slowly to the boil, work a short time at this temperature and then continue the operation with turned-off steam. Dark shades may be entered at the boil in as short a liquor as possible.

b) Aftertreatment of the Benzo Colours.

1. Aftertreatment with copper sulphate. After rinsing, treat for 15—20 minutes in a bath at 120—140° Faht. containing 1—3% copper sulphate and a little acetic acid.

The following are a few of the colours which are rendered considerably faster to light by this aftertreatment:

Blue:	Benzo Blue R W
	Benzo Copper Blue B, 2 B
	Benzo Sky Blue
	Brilliant Azurine R
	Brilliant Benzo Blue 6 B
Violet:	Azo Violet

(See patterns 136 and 137.)

2. Aftertreatment with bichrome and copper sulphate. Prepare the bath with an addition of 2—3% bichrome, 2—3% copper sulphate and (according to the hardness of the water) 2—4% acetic acid, boil up, work for 20—30 minutes and then rinse.

The following colours (to give a few examples) are rendered faster to light and washing by this aftertreatment:

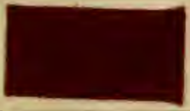
Red: Benzo Red 12 B
Yellow: Chloramine Yellow H W
Olive: Benzo Olive
Blue: Benzo Azurine G
Benzo Copper Blue B, 2 B
Brilliant Azurine R
Brown: Benzo Brown 3 G C, M C,
Benzo Chrome Brown brands
Pluto Orange G
Toluylene Orange G
Black: Benzo Chrome Black B, N
Benzo Chrome Black Blue B

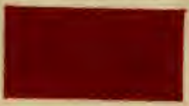
(See patterns 142 and 147.)

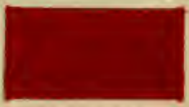
3. **Aftertreatment with formaldehyde.** Treat the shades for ½ hour in a cold bath with 0.5—2% tech. formaldehyde or for 15—20 minutes at 140° Faht., and then rinse.

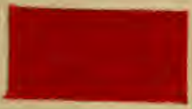
This treatment considerably enhances the fastness to washing of the following colours:

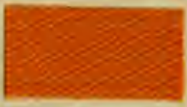
Green: Benzo Olive
Brown: Benzo Brown M C
Pluto Brown N R, R, V extra
Black: Benzo Deep Black S S
Direct Deep Black brands
Plutoform Black L
Pluto Black brands.

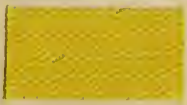
122

3% Benzo Fast Bordeaux 6 B L

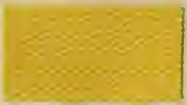
123

3% Benzo Fast Rubine B L

124

3% Benzo Fast Red 8 B L

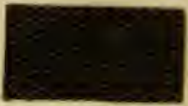
125

3% Benzo Fast Scarlet 4 B S

126

2% Benzo Fast Orange 2 R L

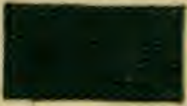
127

1% Benzo Fast Yellow 4 G L extra

128 

1,5% Benzo Fast Yellow RL

129 

1,5% Benzo Bronze G C

130 

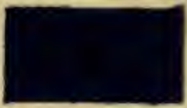
3% Benzo Green F F G

131

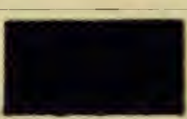
3% Benzo Dark Green B

132

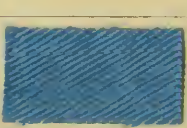
3% Benzo Fast Blue F F L

133 

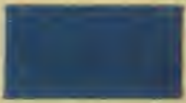
3% Brilliant Fast Blue 3 B X

134 

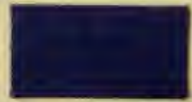
3% Diazo Black B H N

135 

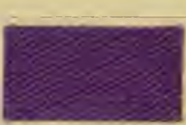
0,5% Benzo Sky Blue

136 

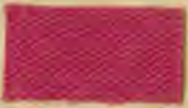
1% Brilliant Benzo Blue 6 B
1% Copper Sulphate

137 

2,5% Benzo Copper Blue 2 B
2,5% Copper Sulphate

138 

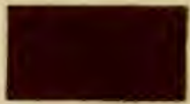
0,5% Brilliant Benzo Violet 2 B H

139 

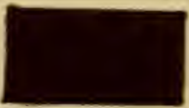
0,5% Benzo Fast Heliotrope 5 R H

140

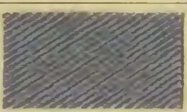
3% Benzo Fast Violet N C

141 

3% Benzo Brown M C

142 

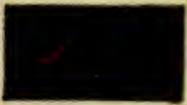
3% Benzo Brown M C
3% Bichrome
3% Copper Sulphate

143 

0,25% Benzo Fast Black

144

0,25% Benzo Black H W

145 

3,5% Direct Deep Black E W extra

146

3,5% Pluto Black G extra

147

7% Benzo Chrome Black B

3% Bichrome
3% Copper Sulphate

The following Benzo colours, some of which are illustrated here, are very fast to light:

Red:	Benzo Fast Pink 2 B L
	Benzo Fast Bordeaux 6 B L
	Benzo Fast Red 6 B L, 8 B L
	Benzo Fast Rubine B L
	Benzo Fast Scarlet 5 B L, 2 G L
Orange:	Benzo Fast Orange 2 R L
	Toluylene Fast Orange L X
Yellow:	Benzo Fast Yellow 4 G L extra, R L
Blue:	Benzo Fast Blue F F L
	Brilliant Fast Blue B, 3 B X
Violet:	Benzo Fast Heliotrope B L, 4 B L, 5 R H, 2 R L
Brown:	Toluylene Fast Brown 3 G, 2 R
Grey and Black:	Benzo Fast Black L
	Benzo Deep Black S S
	Pluto Black G extra.

Almost any popular shade can be produced by the above colours.

Our Brilliant Benzo Violet and Benzo Fast Heliotrope brands are distinguished by their clearness of shade; Brilliant Benzo Violet 2 B H and Benzo Fast Heliotrope 5 R H are faster to ironing than the other brands.

Benzo Green F F and F F G are the brightest of the green brands.

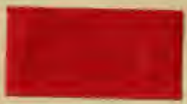
On account of their good level-dyeing property, all the above colours may be combined with one another for the production of fashion, brown, olive and blue shades etc.

c) The Dyeing of Bright Shades in One Bath.

Dye, according to the depth of the required shade, with an addition of 15—20% Glauber's salt cryst. and 2—4% acetic acid, enter at 120—140° Faht., warm up to 175—195° Faht. and work at this temperature for $^3/_4$—1 hour.

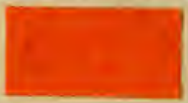
By adopting this method, very bright, full shades are obtained.

148



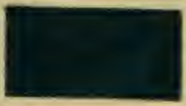
1,25 % Benzo Fast Red 8 B L
0,7 % Rhoduline Pink 4G (Rhodamine 4 G)

149



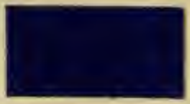
2 % Brilliant Pure Yellow 6 G extra
1,75 % Benzo Fast Orange S

150



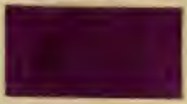
2 % Benzo Green F F
1,25 % Brilliant Sky Blue 5 G

151



1,25 % Benzo Fast Heliotrope B L
1,25 % Brilliant Sky Blue 5 G

152



1,5 % Benzo Fast Heliotrope B L
0,7 % Rhoduline Pink 4 G (Rhodamine 4 G)

In addition to the colours illustrated above, the following brands (to give a few examples) may be dyed according to this method:

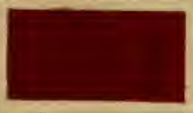
Red:	Benzo Fast Pink 2 B L
	Brilliant Geranine B
Orange:	Benzo Fast Orange 2 R L
	Congo Orange R G
Green:	Benzo Green C
	Brilliant Benzo Green B
Blue:	Benzo Fast Blue F F L, 5 R
	Benzo New Blue 5 B
	Brilliant Benzo Blue 6 B
	Brilliant Fast Blue B, 3 B X.

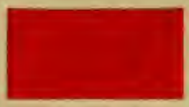
The brightest green is obtained with a combination of Brilliant Pure Yellow 6 G extra and Brilliant Sky Blue 5 G.

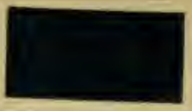
d) Dyeing with Diazo Colours.

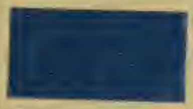
Dye in the same way as Benzo colours, i. e. with an addition of soda and Glauber's or common salt. Afterwards rinse well and diazotise for 20—30 minutes in a cold bath with 1.5—2.5 % nitrite, 5—7.5 % hydrochloric acid 32° Tw. or 3—5 % sulphuric acid 142° Tw., according to the depth of the shade. Then rinse and develop in a cold bath for 20—30 minutes with the developers mentioned in the recipes. (Developer H should be dissolved with an addition of 1/3 as much soda.)

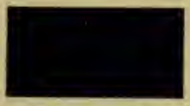
This method is chiefly resorted to when special importance is attached to good fastness to washing.

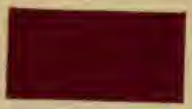
153

3,5% Diazo Fast Bordeaux B L
1,5% Developer A

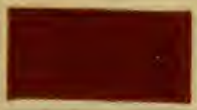
154

3 % Diazo Brilliant Scarlet B G extra
1,5% Developer A

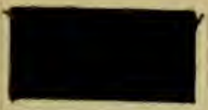
155

2,5% Diazo Fast Green B L
1,5% Developer A

156

1 % Diazo Sky Blue 3 G L
0,8% Developer A

157

3 % Diazo Indigo Blue 3 R L
1,5% Developer A

158

2,5% Diazo Fast Violet 3 R L
1,5% Developer A

159

3 % Diazo Brown N R
1,5% Developer H

160

8 % Diazo Black O B
1 % Developer A
0,5% Developer H

161

8 % Diazo Fast Black V
1 % Developer A
0,5% Developer H

Besides good fastness to washing, Diazo Fast Bordeaux B L, Diazo Fast Green B L and Diazo Fast Violet 3 R L possess very good fastness to light. The same remark applies to Diazo Fast Yellow G (Dev. Z), Diazo Fast Red 7 B L and Diazo Fast Violet B L, colours which are not illustrated above.

Diazo Brilliant Scarlet B G extra dissolves readily. Diazo Brilliant Scarlet B extra, B A extra, B G extra, 3 B extra, 3 B A extra, 6 B extra, 2 B L extra conc., 5 R L extra, G extra and P R extra (all developed with Developer A) yield shades, fast to washing, ranging from yellowish scarlet to claret. These colours are frequently used in place of Primuline and Turkey red.

Diazo Sky Blue 3 G L is esteemed on account of its clear shade and good fastness to light. Diazo Indigo Blue 3 R L, as the name implies, comes midway between the 2 R L and 4 R L brands as regards shade, and is employed as a substitute for Indigo. All the Diazo Indigo Blue brands possess very good fastness to light, as well as good fastness to washing; the 4 G L extra yields a very clear shade.

Diazo Brown N R arouses interest on account of the fact that, with Developer H, it gives a pronounced brown shade of good fastness to washing. Diazo Brown 3 G yields a very bright yellow-brown with Developer H and a clear golden yellow with Developer Z, whilst Diazo Brown 3R produces a deep brown with Developer A or H and a yellow brown with Developer Z; both colours are very fast to washing. Diazo Yellow R (Dev. Z) is also very fast in this respect.

Diazo Black OB, OT and Diazo Fast Black MG, when developed with a combination of Developers A and H, yield shades resembling Aniline Black; Diazo Fast Black V and extra give full blue blacks.

Pleasing, bloomy black shades are obtained by combining any of the above-mentioned blacks with Diazo Olive G.

e) Dyeing with Katigen Colours.

Dissolving the colour. Dissolve the ordinary brands with half the amount of sodium sulphide conc. and the extra brands with an equal amount. The exceptions are: Katigen Violet 3R which is dissolved with $^3/_4$ the amount, Katigen Yellow Brown RL, Katigen Bronze GL which are dissolved with an equal amount, and Katigen Azurine WR extra conc. which requires double the amount. Katigen Deep Black B, though supplied in a highly concentrated form, requires only $^3/_4$ as much or an equal amount of sulphide.

To dissolve the colour, pour a little boiling-hot water over it and the requisite amount of sodium sulphide conc., mix into a good paste and then boil up.

(When dyeing light shades, it is generally advisable to increase the quantity of sodium sulphide conc. a little.)

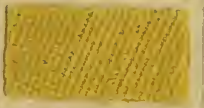
The dyeing process. Add to the bath, according to the hardness of the water and the depth of the required shade, 2—8% soda ash (calculated on the weight of the material), bring to the boil and, if necessary, skim off. Afterwards add the colour-solution, boil well and add 10-60% Glauber's salt cryst. or 5—30% common salt.

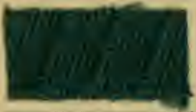
In the case of Katigen Green GK, it is better to add the salt after having worked for $^1/_2$ hour.

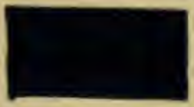
Work at a high temperature by entering near the boil, turning off steam and treating for 1 hour.

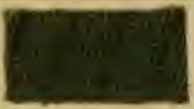
The Katigen Indigo brands, Katigen Azurine WR extra conc. and Katigen Direct Blue RF extra should be dyed at 140^0 Faht. In the case of Katigen Direct Blue RF extra and Katigen Blue B, rinse immediately after dyeing, whilst in the case of the Katigen Indigo brands and Katigen Azurine WR extra conc., squeeze out and air for $^1/_4$ - $^1/_2$ hour. When dyeing the Katigen Red Brown brands and Katigen Brown 2 R and 4 R, it is advisable to add some acetic acid to the last rinsing bath

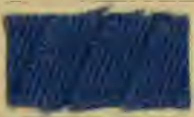
The Katigen colours, as a rule, are very fast to washing and light; some are fast to boiling in direct shades. Many are rendered considerably faster to boiling by an aftertreatment with bichrome. This treatment is carried out for $^1/_2$ hour at about 200° Faht. with an addition of 2–3% bichrome and 3–4% acetic acid.

162

3% Katigen Yellow G G extra

163

10% Katigen Brilliant Green 3 G

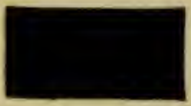
164

7% Katigen Green G K extra

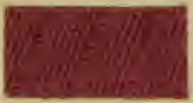
165

10% Katigen Olive G N

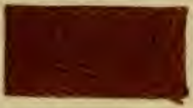
166

2% Katigen Indigo C L G G extra

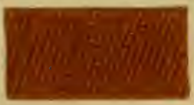
167

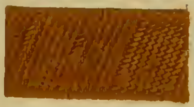
4% Katigen Azurine W R extra conc.

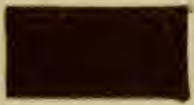
168

6% Katigen Direct Blue R F extra

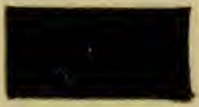
169

6% Katigen Violet 3 R

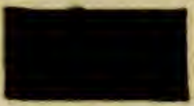
170

7% Katigen Red Brown 6 R

171

10% Katigen Yellow Brown R L

172

7% Katigen Bronze G L

173

8% Katigen Black Brown B S extra conc.

174

7% Katigen Black T extra new

175

7% Katigen Deep Black B

The Katigen brands, some of which are exceedingly fast, are used for dyeing all kinds of cotton material, as well as linen and half-linen, wherever fastness to washing and light is demanded.

Katigen Yellow GG extra yields the clearest yellow shade and is fast to washing; the fastness to light, as in the case of all the yellow sulphide colours, is not so good. Katigen Green GK extra is far superior to all the other green brands in fastness to boiling: Katigen Brilliant Green 3G is distinguished by a very clear, yellowish shade, as well as by very good fastness to light and good fastness to washing. Katigen Olive GN is fast to washing and light. Katigen Indigo CLGG extra is fast to washing, very fast to light and relatively fast to chlorine.

Katigen Azurine WR extra conc. is very productive and exceedingly soluble; it is especially well adapted for dyeing in machines. When dyeing Katigen Direct Blue RF extra, the rinsing (pack system etc.) may be carried out immediately after dyeing (without air-oxidation). Both colours are very fast to light and fast to washing and, like the Katigen Indigo brands, are used as substitutes for Indigo. Katigen Violet 3R is distinguished by a particularly pleasing shade and is thus suitable for the production of lilac tones or for shading other Katigen colours to the violet side; it possesses good fastness to washing.

Katigen Yellow Brown RL and Katigen Bronze GL are exceedingly fast to light, very fast to washing and fast to boiling (even without being aftertreated with metallic salts). Katigen Bronze GL is employed as a yellow constituent (fast to light) for combination shades. Katigen Red Brown 6R is employed for copper shades and as a combination colour; its fastness to washing is good.

Katigen Black Brown BS extra conc. (like all the other Katigen Black Brown brands) is very fast to washing, boiling and light. The same remark also applies to Katigen Black T extra new and Katigen Deep Black B, as well as to the other Katigen Blacks not illustrated above.

f) Dyeing with Basic Colours.

Dissolve the basic colour in boiling water (if considered advisable, mix into a paste with a little acetic acid beforehand). Before dyeing, mordant the material with 2—5% tannic acid or, in the case of very dark shades, with 30—40% sumac; treat for a short time at 140—160° Fahr. and then lay the material in the liquor a few hours or, better still, overnight. Afterwards squeeze out, treat for 20—30 minutes in a cold bath with 1—2.5% tartar emetic or antimony salt and rinse well.

If sumac is employed, pyrolignite or nitrate of iron may be substituted for tartar emetic.

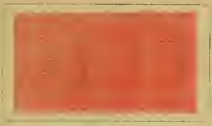
Whilst mordanting with tannin and whilst dyeing, the material must not come into contact with iron else black stains will be caused.

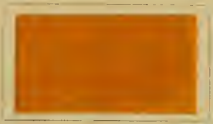
Dye with an addition of 1—2% acetic acid or 3—5% alum; enter cold and slowly warm up to 120—140^0 Faht.

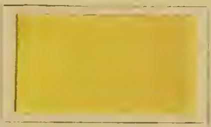
Since the basic colours are rapidly absorbed, and uneven shades easily obtained in consequence, it is advisable to add the colour-solution in several portions and to take care that the temperature of the bath is raised slowly.

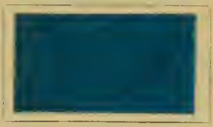
A short aftertreatment in a cold bath containing 2% tannin ($^1/_2$ hour) and 1% tartar emetic ($^1/_4$ hour) considerably improves the fastness to washing.

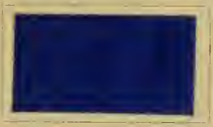
The following shades were dyed on a tannin—tartar emetic mordant.

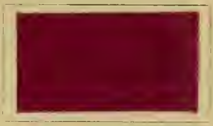
176

0,5% Rosole Red B extra

177

2% Rhoduline Orange N

178

0,5% Rhoduline Yellow T

179

1% Brilliant Green cryst.

180

0,5% Victoria Blue B

181

1,5% Brilliant Rhoduline Purple R

The basic colours are employed for very bright shades such as cannot be produced by any other colours. They are sometimes used for shading Benzo and Katigen colours by top-dyeing in a cold bath with an addition of acetic acid, without previously mordanting with tannin.

III. The Dyeing of Half-wool.

The Dyeing of Half-wool.

a) Dyeing with Benzo and Neutral-dyeing Wool Colours.

The Benzo colours, either alone or in combination with acid wool colours which dye in a neutral bath, are chiefly employed for re-dyeing half-woollen dress material, casement cloth, blankets, skirt protectors etc. and sometimes for suitings. They are also resorted to when sewing threads and cotton or silk facings in woollen goods are to be dyed a uniform shade.

The dyeing is generally carried out with an addition of 30—40% Glauber's salt cryst. As a rule, the Benzo colours dye the wool more deeply than the cotton when dyeing at the boil, whilst below the boil, they have a greater affinity for the cotton. By a proper selection of colours, therefore, and a careful regulation of the temperature, uniform results are obtained.

182

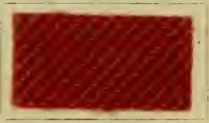
4% Benzo Fast Bordeaux 6 B L

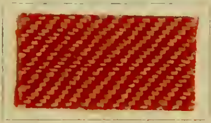
183

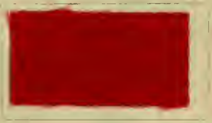
4% Benzo Rubine S C

184

4% Benzo Fast Red F C

185

4% Benzo Purpurine 10 B

186

4% Benzo Purpurine 4 B

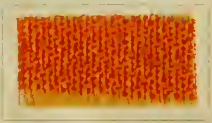
187

3% Benzo Fast Scarlet 8 B S

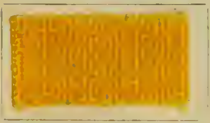
188

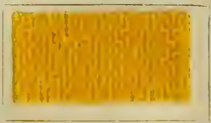
3% Benzo Fast Scarlet 4 B S

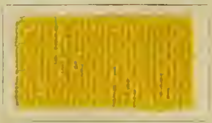
189

3% Benzo Scarlet B C

190

2,5% Benzo Orange R

191

2,5% Chrysophenine G

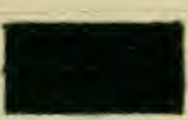
192

2,5% Chloramine Yellow M

193

1,5% Benzo Fast Yellow 4 G L extra

Benzo Fast Bordeaux 6BL, Benzo Fast Red FC, Benzo Fast Yellow 4GL extra, Chloramine Yellow M and Chrysophenine G are remarkable for their very good fastness to light. Benzo Fast Red FC is also distinguished by good fastness to washing.

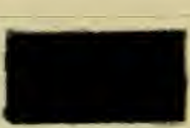
Benzo Scarlet BC is particularly fast to light when dyed on wool; it serves to produce bright scarlet shades. As it is more strongly absorbed by the wool when working at the boil, it is advisable to dye at a temperature not higher than 160—175° Faht. and to add (if considered necessary), in addition to the Glauber's salt, $^1/_2$—1% soda or borax; in this way the colour is prevented from being too strongly absorbed by the wool.

Benzo Purpurine 4B and 10B are employed for the production of cheap scarlets and claret, and the Benzo Fast Scarlets for reds fast to acid. Owing to their good level-dyeing property, all the above brands are serviceable as combination colours for the production of fashion shades, olives and browns.

194

3% Benzo Green FF

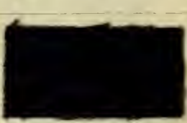
195

3% Benzo Green C

196

3% Benzo Dark Green B

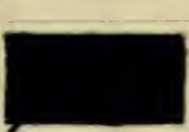
197

1,5% Benzo Sky Blue
0,5% Brilliant Wool Blue
FFR extra

198

3% Diazo Black BHN

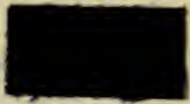
199

3,5% Brilliant Fast Blue
3BX
0,4% Wool Fast Blue BL

200

[illegible] Benzo Fast Blue
FFL
0,5% Wool Fast Blue BL

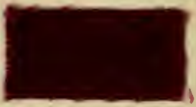
201

4% Navy Blue for
Halfwool NG 2533

202

4% Navy Blue for
Halfwool B

203

[illegible] Benzo Fast Violet NC

204

4% Chloramine Violet R

Benzo Dark Green B and Benzo Green FF are rendered considerably faster to washing by an aftertreatment with fluoride of chrome.

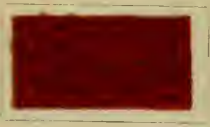
Benzo Sky Blue is more strongly absorbed by the cotton and is generally used in combination with Brilliant Wool Blue to dye bright, light blue shades. Brilliant Benzo Blue 6 B behaves in the same way. Diazo Black B H N is in great favour for the dyeing of half-wool; in combination with blue wool colours, it yields pleasing and cheap dark blues.

Brilliant Fast Blue 3 B X and Benzo Fast Blue F F L are distinguished by specially good fastness to light. In order to obtain uniform (solid) blue shades, they are most suitably combined with Wool Fast Blue B L, G L etc. Moreover, both brands are useful as blue combination colours, e. g. with Benzo Fast Bordeaux 6 B L and Benzo Fast Yellow 4 G L extra, to produce fashion shades fast to light.

Navy Blue for Halfwool B and N G 25336, without being combined with other colours, yield bright, uniform navy blues; so too does Benzo Blue R W which is not illustrated here.

Benzo Fast Violet N C dyes the cotton more readily than the wool; it is employed for the production of lilac and heliotrope shades, fast to light, and (in combination with other colours) for dyeing fashion and claret tones. Chloramine Violet R has the same field of application as Benzo Fast Violet N C.

205

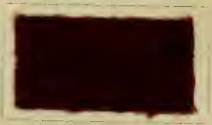


4% Benzo Chrome Brown G

206

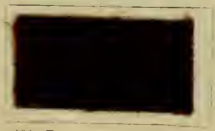
4% Benzo Brown M C

207



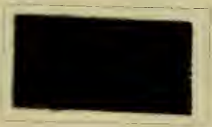
4% Pluto Brown R

208



4% Benzo Dark Brown extra

209



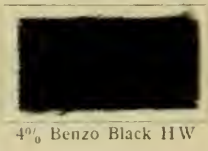
4% Brown for Halfwool 3 G

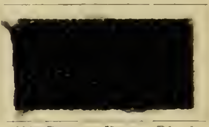
210

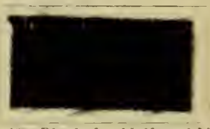
4% Brown for Halfwool R

Of the brown colours, Toluylene Fast Brown 2 R and 3 G are the fastest to light; then come Benzo Chrome Brown G and Benzo Brown M C which are also fast to washing.

Benzo Dark Brown extra and Brown for Halfwool R are especially serviceable for cheap, dark brown shades, on account of their great covering power. Pluto Brown R is very suitable for reddish browns and Brown for Halfwool 3G for a medium brown. With Toluylene Fast Brown 3G and 2R, almost uniform shades are obtained. Benzo Brown D3G extra and 3GC yield very bright, full, copper brown shades.

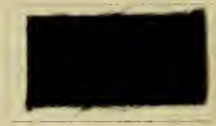
211

4% Benzo Black HW

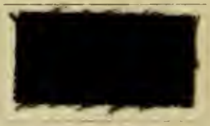
212

4% Benzo Deep Black SS

213

4% Black for Halfwool N

214

4% Direct Deep Black E extra

215

6% Blue Black for Halfwool G

216

5% Black for Halfwool G

217

4% Pluto Black F extra

218

2,5% Pluto Black FW extra conc.

Benzo Black HW and Benzo Deep Black SS are especially well adapted for light or dark greys and for combination with red and yellow colours to produce fashion shades. The latter of these black brands is distinguished by good fastness to light.

Black for Halfwool N is suitably employed as a combination colour for the production of dark blues, for it covers the cotton deeply but leaves the wool a light shade, and is thus easily shaded by suitable wool colours.

Direct Deep Black E extra, Black for Halfwool G, Blue Black for Halfwool G and the Pluto Black brands all yield useful black shades.

b) Benzo Colours chiefly used for subsequently covering the Cotton.

The colours are used for the following purposes:

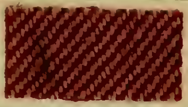
1. For covering sewing threads or cotton parts in material which has been dyed with acid colours. After dyeing with acid colours, rinse well. Cover the cotton in a fresh bath which is either cold or at about

85⁰ Faht. and which is as short as possible. Employ an addition of 1—3 lbs. Glauber's salt cryst. and, if necessary, 1/5 oz. soda ash or about 1/2 gill ammonia per 10 gallons liquor. By adhering to this recipe, according to which the following patterns have been dyed, the cotton is deeply covered whilst the wool remains almost unaffected.

2. In combination with neutral-dyeing wool colours for the production of uniform shades. Dye as stated under a).

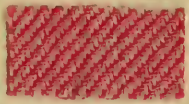
3. For shading or covering the cotton when this material is not sufficiently dyed. Add the colour to the bath in which the material has already been dyed and work at a low temperature.

219



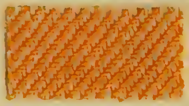
2% Benzo Bordeaux 6 B

220



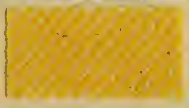
1% Benzo Fast Pink 2 B L

221



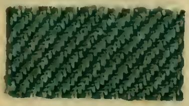
2% Chloramine Orange G

222



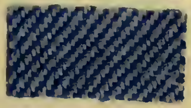
1% Direct Yellow R extra

223



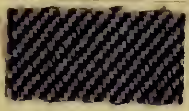
3% Benzo Green F F

224



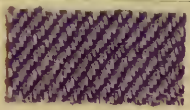
2% Benzo Sky Blue

225



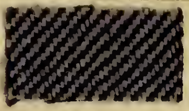
3% Diazo Black B H N

226



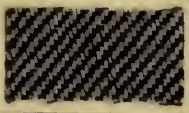
2% Brilliant Benzo Violet 2 B H

227



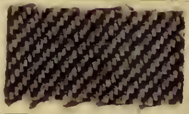
5% Direct Black R C

228



5% Direct Black V T

229



3% Pluto Milling Black B

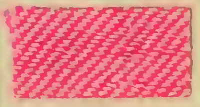
In addition to the colours illustrated, the following are adapted for subsequently covering the cotton:

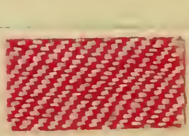
Red:	Benzo Fast Scarlet 4 B S, 5 B S, 8 B S, G S Benzo Purpurine 6 B Benzo Red S G Geranine G
Orange:	Toluylene Fast Orange G L, L X

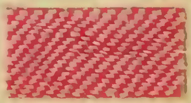
Yellow:	Benzo Fast Yellow RL Chloramine Yellow FF, GG, HW, M Direct Yellow R
Green:	Benzo Green C
Blue:	Benzo Chrome Black Blue B Brilliant Azurine 5G Brilliant Benzo Blue 6B Halfwool Blue G, R, 3R
Violet:	Benzo Violet R
Brown:	Chloramine Brown G
Black:	Blue Black for Halfwool G Pluto Black BS extra, 5BS extra

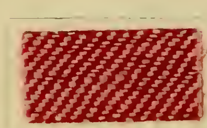
c) Acid Colours which are absorbed by Wool in a Neutral Bath and are therefore serviceable for shading this Fibre.

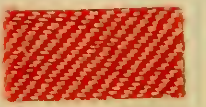
Dye in the same way as stated under a) for Benzo colours.

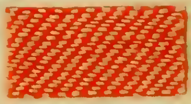
230

0,5% Rhodamine B

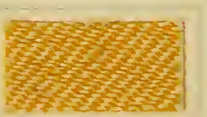
231

1% Alizarine Rubinole R

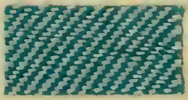
232

1% Alizarine Rubinole GW

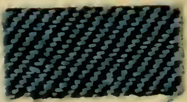
233

2% Fast Red A

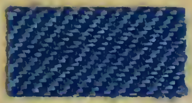
234

2% Acid Anthracene Red G

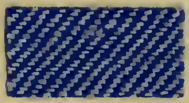
235

2% Sulphon Orange G

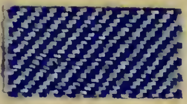
236

2% Indian Yellow G

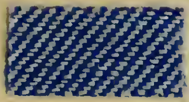
237

2% Fast Green CR

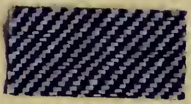
238

2% Sulphon Acid Green B

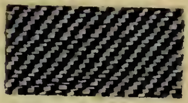
239

0,75% Alkali Blue 6 B

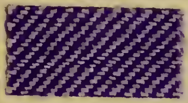
240

2% Brilliant Wool Blue B extra

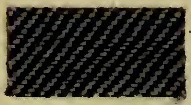
241

2% Brilliant Wool Blue F F R extra

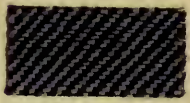
242

2% Wool Blue N extra

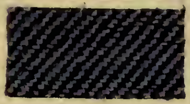
243

2% Wool Fast Blue B L

244

1% Sulphon Cyanin G R extra

245

1,5% Alkali Violet L R

246

3% Naphtylamine Black 6 B

247

3% Naphtylamine Black F

248

3% Naphtylamine Black F S

Of all the red colours which are chiefly used in combination with others for the production of fashion shades, Alizarine Rubinole R and G W are the fastest to light.

Rhodamine B is applied in combination with Benzo Fast Scarlet 4 B S and 8 B S, Benzo Fast Pink 2 B L etc. for brightening pink shades. Very pleasing, uniform shades are obtained by dyeing equal parts of Rhoduline Pink 4 G (Rhodamine 4 G) and Benzo Fast Eosine B L. Acid Anthracene Red G is suitable for dyeing reds fast to washing, and Fast Red A for full claret shades when little importance is attached to fastness to washing.

Indian Yellow G is serviceable as a cheap yellow.

Sulphon Orange G, Fast Green C R, Sulphon Acid Green B, Sulphon Cyanine 5 R extra, Wool Fast Blue B L and Alkali Violet L R are all fast to washing. Brilliant Wool Blue B extra, FFR extra and Wool Blue N extra are used for bright blue shades, especially in combination with Benzo Sky Blue and Brilliant Benzo Blue 6B. Sulphon Cyanine 5R extra and Wool Fast Blue BL are very fast to light.

Alkali Blue 6B comes into consideration as a combination colour for brightening shades ranging from a pale blue to a navy blue. In order to develop the shade, it is necessary, after dyeing and rinsing, to acidulate in a lukewarm bath with formic or sulphuric acid, and then to rinse again.

The Naphtylamine Blacks are useful both for ladies' dress material and for men's suitings.

d) First dyeing the Wool and then covering the Cotton.

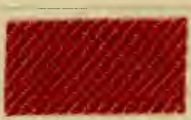
Dye the wool in an acid bath, as usual, rinse well and then cover the cotton (sewing threads, lining, facings etc.) in a fresh, short bath, as described under b) 1. (In most cases, it will be found sufficient to add Glauber's salt only; soda or ammonia prevent the colour from going on to the wool even more effectually, but injure the wool unless care is exercised in their use.)

The colours suitable for subsequently covering the cotton are given under b).

Wool previously dyed with:

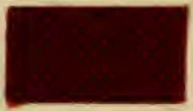
Cotton covered with:

249



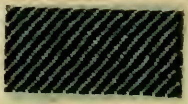
2 % Fast Red A

250



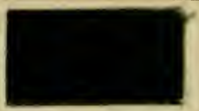
2,25 % Benzo Bordeaux 6B
1,5 % Direct Yellow R extra

251



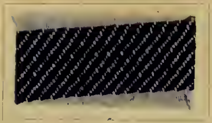
2 % Wool Green BS
0,2 % Tartrazine
0,1 % Orange II B

252



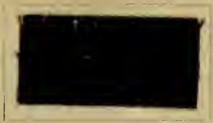
3 % Benzo Green FF
1 % Direct Yellow R extra
2 % Diazo Black BHN

253



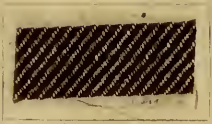
1,75% Wool Fast Blue
B L

254



3 % Diazo Black B H N
0,3% Benzo Bordeaux
6 B

255

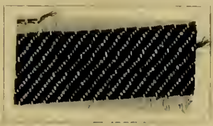


0,65% Tartrazine
0,4 % Azo Fuchsine 6 B
0,08% Brilliant Acid Blue
A

256

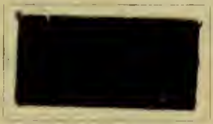
5 % Chloramine Orange
G
0,5% Diazo Black B H N

257



4% Naphtylamine Black
C S B

258



6% Direct Black R C

e) First dyeing the Cotton and then cross-dyeing the Wool.

For previously dyeing the cotton, it is best to use Diazo colours fast to cross-dyeing.

Add the Diazo colour and

1—2 lbs. Glauber's salt cryst. and $^4/_5$ oz. soda ash

per 10 gallons to the dye-bath; dye for 1 hour at 120—140° Faht. The diazotising and developing are carried out in the way described under "The Dyeing of Cotton" d).

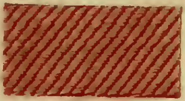
After dyeing the cotton rinse, and cross-dye the wool with an addition of Glauber's salt and sulphuric acid.

In the case of black (pattern 267), the wool colour may be dyed together with the Diazo colour, as is often done when dyeing half-wool; the goods are then rinsed, diazotised and developed.

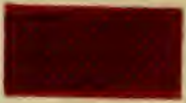
The Dyeing of Half-wool.

Cotton previously dyed with:

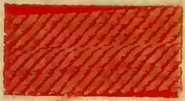
Wool cross-dyed with:

259 

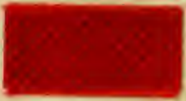
2,5% Diazo Bordeaux 7 B
1,5% Developer A

260 

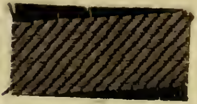
1,25% Azo Fuchsine 6 B

261 

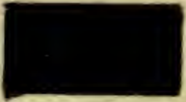
2,5% Diazo Brilliant Scarlet 3 B A extra
1,5% Developer A

262 

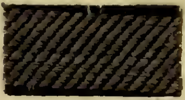
2% Fast Ponceau L

263 

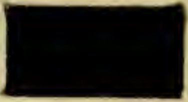
4 % Diazo Black B H N
1,5% Developer A

264 

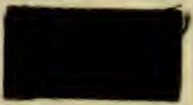
1,5% Fast Acid Cyanine G R

265 

4 % Diazo Fast Black M G
1 % Developer A
0,5% Developer H

266 

3% Naphtylamine Black F

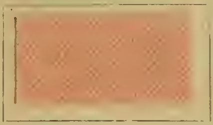
267 

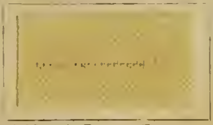
5 % Diazo Black B H N
3 % Naphtylamine Black 4 B K
1,25% Developer A
0,25% Developer H

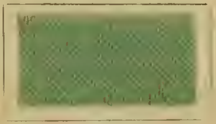
Shades produced according to the above method are distinguished by very good fastness to rubbing. By cross-dyeing the wool with Sulphon or mordant colours, shades exceedingly fast to washing can be obtained. (For other Diazo colours suitable for the above method, see our Half-wool Brochure No. 1554, 1910.)

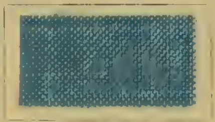
f) Combination Shades.

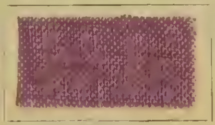
The following patterns are merely intended to show how Benzo and wool colours may be combined to produce delicate or pale shades. Other shades can be obtained with the colours illustrated in this chapter (Half-wool).

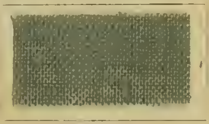
268

0,015% Benzo Fast Pink 2 B L
0,02 % Rhodamine B

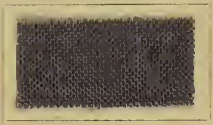
269

0,02 % Benzo Fast Yellow 4 G L extra
0,0075% Benzo Orange R

270

0,1 % Benzo Green F F
0,04 % Benzo Fast Yellow 4 G L extra
0,025% Brilliant Acid Blue F F

271

0,2 % Benzo Sky Blue
0,075% Brilliant Wool Blue B extra

272

0,12% Brilliant Benzo Violet 2 B H
0,03% Alkali Violet L R

273

0,15 % Benzo Deep Black S S
0,0125% Chloramine Orange G
0,02 % Brilliant Acid Blue A

274

0,29 % Benzo Deep Black S S
0,02 % Benzo Rubine S C
0,034% Wool Fast Blue BL

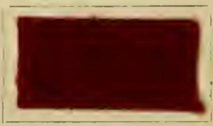
g) Chrome Process for Half-wool.

When dyeing according to this new method, acetic or formic acid and bichrome are added to the bath, in addition to the Glauber's salt. Several important advantages are attached to this method of dyeing with acid and bichrome: It allows of the employment of wool colours faster to light, washing and wear. The fastness (especially the fastness to washing) of a number of Benzo colours is improved by dyeing with bichrome. The half-woollen material receives a much better handle than when dyed in a neutral bath, and creases (due to heat) are avoided. The cotton parts are covered well and, when the dyeing is properly performed, can be dyed a deeper shade than the wool.

The Dyeing of Half-wool.

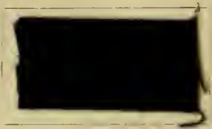
Dye for 1 hour with an addition of 30% Glauber's salt cryst., 1.5—3% acetic acid 30% or a corresponding amount of formic acid, and 0.2—0.5% bichrome. Add the colour to the bath first, then the Glauber's salt, afterwards the acid and, lastly the bichrome. Enter at 140—160° Faht., raise to the boil and boil for 1 hour. If preferred, boil for 1/2 hour, turn off steam and work for another 1/2 hour, as is usually done when dyeing half-wool. In many cases, the dyeing may be carried out at 195—200° Faht. The temperature depends on the depth of the required shade; as a rule, both fibres are dyed a deeper shade by boiling for 1/2—1 hour.

275



2 % Benzo Red 10 B
2 % Benzo Fast Scarlet 4 B S
0,3% Benzo Chrome Black Blue B

276

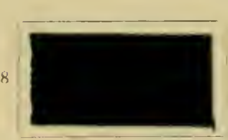


3 % Benzo Copper Blue B
0,5% Direct Deep Black E W extra
1 % Wool Fast Blue G L

277

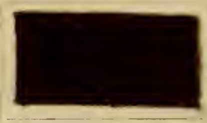
4 % Benzo Olive
1 % Direct Yellow R extra
0,5% Brilliant Acid Blue A

278



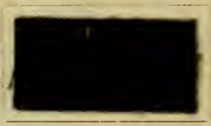
3 % Benzo Green F F
2 % Benzo Chrome Black Blue B
1 % Direct Yellow R extra
1,25% Brilliant Acid Green 6 B

279



4 % Benzo Chrome Brown B
0,75% Direct Yellow R extra
0,15% Wool Fast Blue B L

280



6 % Direct Deep Black E W extra
0,15% Direct Yellow R extra
1 % Naphtylamine Black 4 B L

The above shades illustrate a few useful combinations and were dyed for 1 hour at the boil with an addition of 30% Glauber's salt cryst., 3% acetic acid and 0.5% bichrome. Since all the Benzo and wool colours are not adapted for this process, we herewith append a list of those mostly used:

	Benzo Colours:	Wool Colours:
Red:	Benzo Fast Scarlet 4 B S, 5 B S, 8 B S N, 24838	Alizarine Rubinole G W, R
	Benzo Purpurine 10 B	Croceine Scarlet 3 B X
	Benzo Red 10 B	Fast Red A
	Benzo Rubine S C	Rhodamine B
		Cloth Red B, 3 B extra, B C, 3 G extra

The Dyeing of Half-wool.

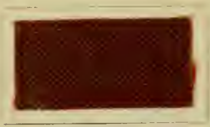
Orange:	Benzo Fast Orange 2 R L Chloramine Orange G Toluylene Fast Orange G L, L X	Fast Light Orange G Orange II B
Yellow:	Chloramine Yellow G G, H W Direct Yellow R, R extra	Anthracene Yellow C Chrome Yellow D F, R extra Diamond Flavine G Fast Light Yellow G Supramine Yellow G, R
Green:	Benzo Green F F Benzo Olive	Alkali Fast Green 3 B, 3 G Alizarine Cyanine Green E, G extra, K Brilliant Acid Green 6 B Monochrome Green B Acid Chrome Green G Sulphon Acid Green B, 2 B L
Blue:	Benzo Chrome Black Blue B Benzo Fast Blue F F L Benzo Copper Blue B, 2 B Benzo Sky Blue Brilliant Fast Blue 3 B X Diazo Black B H N Black for Halfwool N	Alizarine Astrole B, G Alizarine Sky Blue B Brilliant Acid Blue A, B Brilliant Wool Blue B extra, G extra Sulphon Cyanine G R extra, G R T extra, 5 R extra, 5 R T extra Wool Blue S R extra Wool Fast Blue B L, G L
Violet:	Benzo Fast Violet N C	Fast Acid Violet 10 B Acid Chrome Violet B Acid Violet 4 B extra, B W Wool Fast Violet B
Brown:	Benzo Chrome Brown B, G, R Direct Fast Brown B	Monochrome Brown B C, G, 3 G, T paste, V
Grey and Black:	Direct Blue Black B 22941 Direct Deep Black E extra, E W extra Blue Black for Halfwool G Black for Halfwool B G N, G Pluto Black G, G extra	Alizarine Blue Black B, 3 B Alizarine Fast Grey S P Monochrome Grey B Monochrome Black F Naphtylamine Black 4 B, 4 B L, 10 B, 5 G L Phenyl Blue Black N Sulphon Cyanine Black B, 2 B, 4 B.

h) Two-coloured Effects.

The following two-coloured effects were produced according to the chrome process for half-wool.

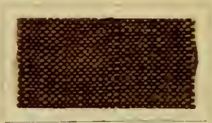
Add the wool colour to the bath and 30% Glauber's salt cryst., 3% acetic acid and 0.5% bichrome, boil for ½—¾ hour, and turn off steam. Afterwards add the Benzo-colour and treat ¾ hour at about 195° Faht.

281



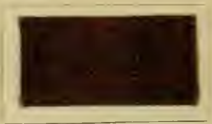
2,5% Acid Anthracene Red 3 B
2 % Benzo Chrome Black Blue B
2 % Direct Yellow R extra

282



1% Acid Violet 4 B extra
2% Direct Yellow R extra

283



2 % Brilliant Acid Blue B
2,5% Benzo Fast Scarlet 4 B S

The two-coloured effects most commonly met with may be produced with the following colours:

For Cotton:

Red: Benzo Fast Scarlet 4 B S
Orange: Chloramine Orange G
Yellow: Direct Yellow R, R extra
Green: Benzo Chrome Black Blue B, Direct Yellow R extra (combined)
Blue: Benzo Chrome Black Blue B
Olive and Brown: Benzo Chrome Black Blue B, Direct Yellow R extra, Chloramine Orange G, Benzo Fast Scarlet 4 B S. (combined with one another as desired).

For Wool:

Red: Alizarine Rubinole G W, R
Croceine Scarlet 3 B X
Rhodamine B
Orange: Fast Light Orange G
Orange II B

Yellow: Fast Light Yellow G
Supramine Yellow G, R

Green: Alkali Fast Green 3 B, 3 G
Brilliant Acid Green 6 B

Blue: Alizarine Astrole B
Brilliant Acid Blue A

Violet: Fast Acid Violet 10 B
Acid Violet 4 B extra
Wool Fast Violet B

Black: Naphtylamine Black 4 B L.

i) The Dyeing of Faded Material.

The following colours are best adapted for dyeing faded material:

Red: Benzo Bordeaux 6 B
Benzo Fast Pink 2 B L
Benzo Fast Red 8 B L, F C, G L, L
Benzo Fast Scarlet 4 B S, 5 B S, 7 B S, 8 B S, G S
Benzo Fast Bordeaux 6 B L
Benzo Purpurine 4 B, 10 B
Benzo Rubine S C
Benzo Scarlet B C
Brilliant Purpurine R

Orange: Benzo Fast Orange 2 R L, S
Benzo Orange R
Congo Orange G, R, R G
Orange T A
Pluto Orange G
Toluylene Fast Orange G L

Yellow: Benzo Fast Yellow 4 G L extra, R L
Chloramine Yellow G G, H W, M, R C
Chrysophenine G, R
Direct Yellow R, R extra
Thiazole Yellow G, 3 G
Toluylene Yellow G

Green: Benzo Dark Green B
Benzo Green F F

Blue:	Benzo Sky Blue
	Chicago Blue B
	Congo Blue 2 B
	Diazo Black B H N
	Navy Blue for Halfwool R 23446
Violet:	Benzo Fast Violet N C
Brown:	Benzo Brown D 3 G extra, 3 G C, M C, R C
	Benzo Chrome Brown B, B S, G, R
	Benzo Dark Brown extra
	Chloramine Brown G
	Direct Fast Brown B, G G
	Brown for Halfwool 3 G, R
	Pluto Brown R, V extra
Black:	Benzo Black H W
	Benzo Deep Black S S
	Blue Black for Halfwool G
	Black for Halfwool B G N, G
	Pluto Black A extra, F extra, F R, F W extra conc., T G extra.

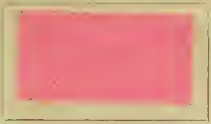
IV. The Dyeing of Silk.

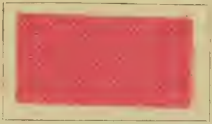
The Dyeing of Silk.

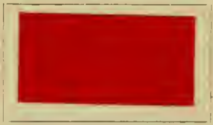
a) Dyeing with Acid Colours.

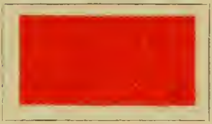
By dyeing in a boiled-off soap bath broken with acid, the most level results are obtained and the material is spared as much as possible. As garment dyers, however, seldom have boiled-off soap baths at their disposal, they may prepare a good substitute by dissolving 1 lb. olive oil soap and $2^{3}/_{5}$—$3^{1}/_{5}$ oz. glue (gelatine) in 4 gallons water. Of this solution, add to the dye-bath a quantity equal to $^{1}/_{3}$—$^{1}/_{4}$ of the volume of the dye-liquor and afterwards, whilst stirring well, slowly add 2—5% sulphuric or acetic acid. Warm up to 85—105° Faht. and treat the silk in this liquor for a short time. Afterwards take out the material, add the well-dissolved colour, stir and commence to dye. Whilst dyeing, warm slowly up to 195° Faht., work for 1 hour altogether, rinse in cold water and scroop with acetic, formic or tartaric acid.

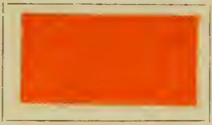
In the case of **Alizarine Rubinole R**, **Alizarine Cyanine Green G extra**, **Alizarine Sky Blue B** and **Alizarine Irisole R**, it is advisable to begin dyeing in a boiled-off soap bath broken with acetic acid only, and afterwards, if the bath does not exhaust, to add some sulphuric acid.

284

0,25% Rhodamine B

285

1% Alizarine Rubinole R

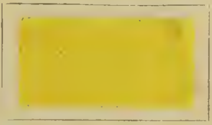
286

3% Fast Red A

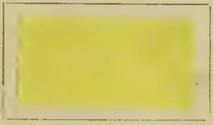
287

3% Silk Scarlet G

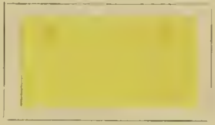
288

3% Orange II B

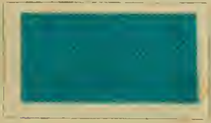
289

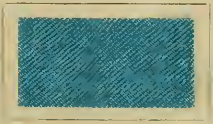
3% Indian Yellow G

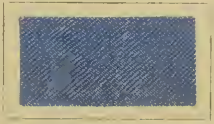
290

3% Supramine Yellow R

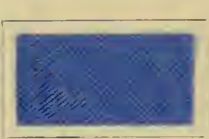
291

0,75% Quinoline Yellow KT extra conc.

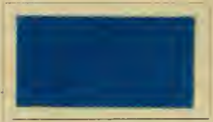
292

3% Quinoline Yellow

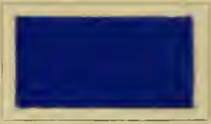
293

3% Acid Green GG extra

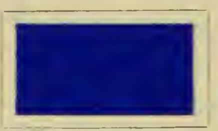
294

1% Alizarine Cyanine Green G extra

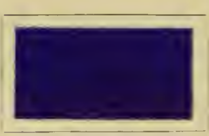
295

1% Alizarine Astrole B

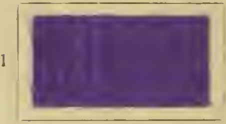
296

1% Alizarine Sky Blue B

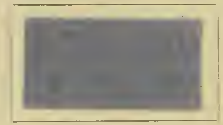
297

3% Brilliant Acid Blue A

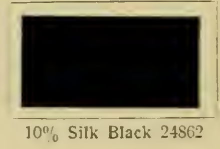
298

2% Brilliant Wool Blue G extra

299

2% Silk Blue B E S

300

3% Fast Acid Violet 10 B

301

1% Alizarine Irisole R

302

0,5% Nigrosine B

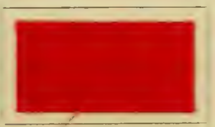
303

10% Silk Black 24862

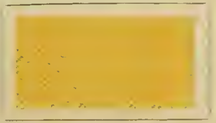
The colours fastest to light are: Alizarine Rubinole 3 G, 5 G, G W, R, Azo Phloxine 2 G, Azo Fuchsine G, Fast Light Orange G, Fast Light Yellow brands, Supramine Yellow G, R, Alizarine Cyanine Green brands, Alizarine Astrole B, Alizarine Sky Blue B, Alizarine Sapphirole B, S E, Alizarine Irisole R.

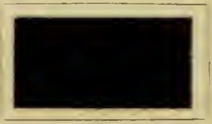
b) Dyeing with Weakly Acid or Sulphon Colours.

Prepare a boiled-off soap bath broken with 2—5% acetic acid and dye and scroop as stated under a).

An aftertreatment with acetate of alumina, 3—5½° Tw. (or acetate of chrome) enhances the fastness to washing and water, but gives the silk a soft handle.

304

3% Cloth Red G

305

3% Sulphon Yellow 5 G

306

4% Sulphon Cyanine G R extra

307

12% Gloria Black N

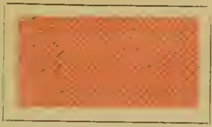
The shades illustrated here are very fast to light.

c) Dyeing with Benzo Colours which are dyed Direct or Diazotised and Developed.

Treat as stated under b), but add the acetic acid in several portions, so that the colour may go on to the material slowly and give even results. In the case of dark shades, up to 10% acetic acid may be added.

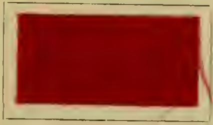
For the diazotising and developing of Diazo colours, see the chapter on the dyeing of cotton.

308



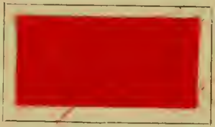
1% Benzo Fast Eosine BL

309



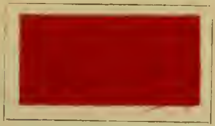
3% Benzo Fast Bordeaux 6 B L

310



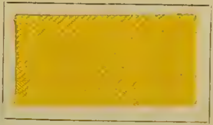
3% Benzo Fast Red 8 B L

311



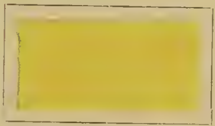
3% Benzo Fast Red F C

312



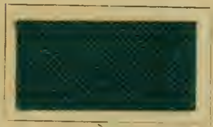
3% Chrysophenine G

313



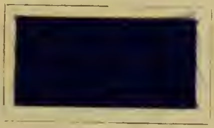
2% Benzo Fast Yellow 4 G L extra

314



3% Benzo Green F F G

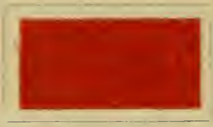
315



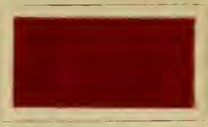
3% Brilliant Fast Blue 3 B X

316

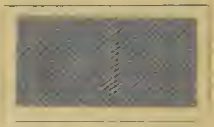
3% Benzo Fast Blue F F L



317 3% Benzo Brown 3GC



318 3% Benzo Brown MC



319 0,25% Benzo Fast Black

320 8% Direct Deep Black E extra

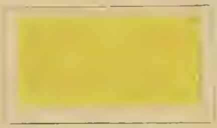
The colours fastest to light are: Benzo Fast Pink 2BL, Benzo Fast Bordeaux 6BL, Benzo Fast Red 6BL, 8BL, Benzo Fast Rubine BL, Toluylene Fast Orange LX, Benzo Fast Yellow 4GL extra, Chrysophenine G, Benzo Fast Blue FFL, Brilliant Fast Blue 3BX and Benzo Fast Black.

d) Dyeing with Basic Colours.

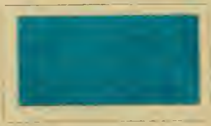
The colours are generally dissolved in distilled water, a little acetic acid being added if necessary.

Dye in a boiled-off soap bath broken with acetic acid or with an addition of 10% olive oil soap and 1—2% acetic acid. An excess of acetic acid has a favourable influence upon the level-dyeing and penetration. Enter at 85° Faht. and slowly warm up to 140—175° Faht. After dyeing, rinse well and scroop as described above.

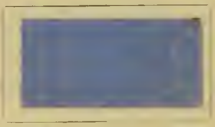
If the shades are aftertreated with tannin or sumac and fixed with tartar emetic, the fastness to washing is considerably improved.



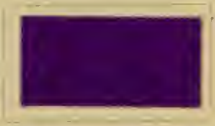
321 1,5% Rhoduline Yellow T



322 2% Brilliant Green cryst.



323 0,25% New Victoria Blue B



324 0,5% Crystal Violet P

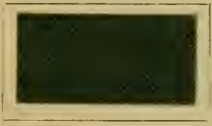
The basic colours are employed for the production of especially bright shades. Their fastness to light is, as a rule, only moderate.

Apart from the colours illustrated above, the following basic colours are generally used for dyeing silk: Diamond Fuchsine, Rhoduline Yellow 6 G, Methylene Blue B B, Turquoise Blue B B, G, Victoria Blue B, the different Methyl Violets, Bismarck Brown R and R extra.

e) Combination Shades.

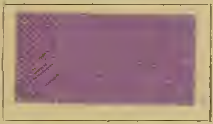
The following are a few useful combination shades. Patterns 325—327 are exceedingly fast to light.

325



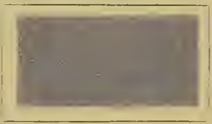
1,5% Alizarine Cyanine Green G extra
4 % Supramine Yellow R
1 % Alizarine Rubinole R

326



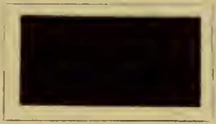
0,3% Alizarine Irisole R
0,2% Alizarine Rubinole R

327



0,3 % Alizarine Cyanine Green G extra
0,26% Supramine Yellow R
0,4 % Alizarine Rubinole R

328



2 % Indian Yellow G
1,3% Fast Red A
1 % Brilliant Acid Blue A

f) Dyeing with Mordant Colours.

1. Alumina mordant. Dissolve 10 lbs. sulphate of alumina (as free as possible from iron) in 5 gallons boiling-hot water and then add 1 lb. $6^2/_5$ oz. soda ash (or 3 lbs. 12 oz. soda cryst.) previously dissolved in 1 gallon hot water, whilst stirring well. Afterwards pour in cold water until the strength of the mordant is reduced to 15° Tw.

Place the silk in the above solution for 4 hours or, better still, overnight; then wash (preferably in the washing machine), treat for

$^1/_4$ hour in a hot soap bath (175° Faht.) containing 10% soap, calculated on the weight of the material. Finally rinse again and dye in a boiled-off soap bath broken with 1—2% acetic acid.

Enter into the cold dye-liquor, bring to the boil in $^3/_4$ hour and boil for 1 hour.

2. Chrome mordant. Place the silk for 2—4 hours in a solution (32° Tw.) of chloride of chrome, rinse well and dye immediately; otherwise proceed in the same way as when dyeing on an alumina mordant.

3. Iron mordant. Place the silk for 4 hours or, better still, overnight in a solution of "nitrate of iron" (basic ferric sulphate) of 32—52° Tw., wash in the washing machine, treat in a warm bath of 120° Faht. and soap for 1 hour, as in the case of an alumina mordant. Afterwards rinse and dye as stated above.

Colours suitable for an Alumina Mordant:

Red:	Alizarine Bordeaux B, G, G G paste Alizarine Purpurine paste Alizarine Red 1 B extra, S X extra, X G G paste
Orange:	Alizarine Orange R paste
Yellow:	Anthracene Yellow paste, C powder Chrome Yellow R extra Diamond Flavine G
Green:	Alizarine Cyanine Green E, G extra, 3 G paste Alizarine Viridine paste Coeruleine S paste
Blue:	Alizarine Blue G G double, G W double, R double, S extra paste Alizarine Cyanine B B S powder, G extra, G G, N D extra, R extra, 3 R double, W B, W R B, W R R paste Brilliant Alizarine Cyanine 3 G paste Chrome Blue paste Celestine Blue B
Violet:	Alizarine Heliotrope R paste Galleine paste
Brown:	Anthracene Brown G, R, W paste
Black:	Alizarine Cyanine Black G paste

Colours suitable for a Chrome Mordant:

Red: Alizarine Bordeaux B, G, G G paste
Alizarine Purpurine paste
Alizarine Red 1 B extra, S X extra, X G G paste

Yellow: Alizarine Yellow 3 G powder
Anthracene Yellow paste, C powder
Chrome Yellow R extra powder
Diamond Flavine G powder

Green: Alizarine Cyanine Green E, G extra, 3 G paste
Alizarine Viridine F F paste
Coeruleine S paste

Blue: Alizarine Blue G G double, G W double, R double, S extra paste
Alizarine Cyanine B B S powder, G extra, G G, N D extra, R extra, 3 R double, W B, W R B, W R R paste
Alizarine Sapphirole S E paste
Brilliant Alizarine Cyanine 3 G paste
Chrome Blue paste
Celestine Blue B
Gallo Cyanine paste

Violet: Alizarine Heliotrope R paste
Chrome Violet paste
Galleine paste

Brown: Alizarine Orange R paste
Anthracene Brown R paste

Black: Alizarine Cyanine Black G paste
Alizarine Fast Grey paste

Colours suitable for an Iron Mordant:

Red: Alizarine Bordeaux B, G, G G paste
Alizarine Purpurine paste
Alizarine Red 1 B extra, S X extra, X G G paste

Yellow: Alizarine Yellow R powder
Anthracene Yellow paste, C powder
Chrome Yellow R extra powder
Diamond Flavine G powder

Green: Alizarine Cyanine Green E, G extra, 3 G paste
Alizarine Viridine F F paste
Coeruleine S paste

Blue: Alizarine Blue R double, S extra paste
Alizarine Cyanine G G, R extra, 3 R double paste
Chrome Blue paste

Violet: Galleine paste

Brown: Alizarine Orange R paste
Anthracene Brown R paste.

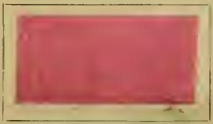
V. The Dyeing of Half-silk.

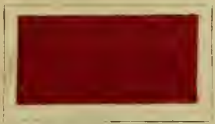
The Dyeing of Half-silk.

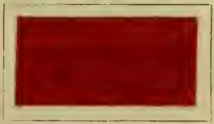
a) Dyeing with Benzo Colours.

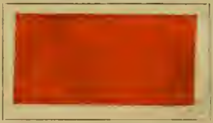
Dye at 195–200° Faht. Light shades require an addition of 10% olive oil soap, 0.25–0.5% soda ash and 10% Glauber's salt cryst. Dark shades require an addition of 10% olive oil soap, 0.5—1% soda ash and 30% Glauber's salt cryst.

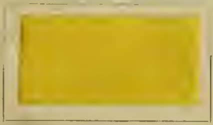
If, as frequently happens, the cotton is more deeply covered than the silk, shade the latter fibre in a fresh, cold (or lukewarm) bath with basic colours, making an addition of 1–2% acetic acid. The silk may also be shaded either with neutral-dyeing acid wool colours in the same bath (see patterns 336 & 337) or in a fresh, cold (or lukewarm) bath with an addition of acetic acid (pattern 329). Suitable wool colours for shading the silk are illustrated in patterns 230—245; the Sulphon Cyanine Blacks and Gloria Black N are adapted for shading black.

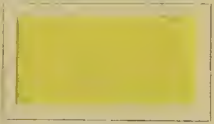
329

0,5 % Brilliant Geranine 2 B N
0,05% Rhodamine B

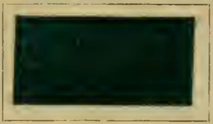
330

4% Benzo Fast Bordeaux 6 B L

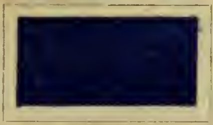
331

3% Benzo Fast Red F C

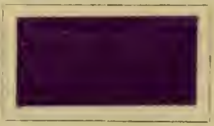
332

3% Benzo Fast Orange S

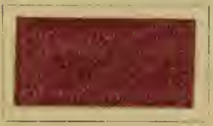
333

1% Benzo Fast Yellow 4 G L extra

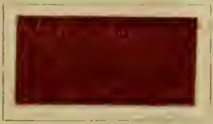
334

1% Brilliant Pure Yellow 6 G extra

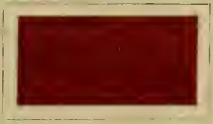
335

3% Benzo Green C

336

2,8% Brilliant Fast Blue 3 B X
0,5% Wool Fast Blue B L

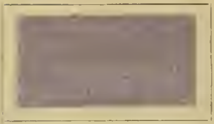
337

1,85% Benzo Fast Heliotrope B L
0,18% Wool Fast Blue B L

338

3% Benzo Fast Violet N C

339

3% Benzo Brown M C

340

3% Pluto Brown R

341



0,25% Diazo Fast Black SD

342

10 % Diazo Fast Black V
1,5% Developer H

Brilliant Geranine 2BN is chiefly used for dyeing bright pink shades fast to light, Benzo Fast Bordeaux 6BL and Benzo Fast Red FC for claret shades fast to light, Benzo Fast Yellow 4GL extra as a yellow combination colour with Brilliant Fast Blue 3BX, and Benzo Fast Bordeaux 6BL for the production of fashion shades etc., fast to light. Brilliant Fast Blue 3BX and Wool Fast Blue BL yield uniform blue shades of very good fastness to light.

Benzo Fast Orange S and Brilliant Pure Yellow 6G extra serve to produce clear orange and pure yellow shades respectively, or as combination colours for different kinds of fashion, olive and brown shades.

Benzo Fast Heliotrope BL possesses good fastness to light and is considerably superior to the basic violet colours in this respect. Benzo Fast Violet NC is also fast to light. Benzo Brown MC and Pluto Brown R are useful colours for the production of dark browns, whilst Diazo Fast Black SD is frequently employed for greys (without developing) and for blacks (with Developers A and F). Diazo Fast Black V, with Developer H, gives a black of very good fastness to washing and light.

In addition to the above-mentioned colours, the following brands are suitable for dyeing half-silk: Benzo Bordeaux 6B for bluish claret shades (the silk is not so deeply dyed); Benzo Green FFG for bright greens (the silk is dyed a yellower and somewhat weaker shade); Benzo Brown D3G extra for browns and Benzo Blue RW for blues. Diazo Black OB and OT, as well as Diazo Fast Black MG and extra dye the cotton (developed with Developer H) a deep black, whilst they leave the silk considerably lighter so that it must be top-dyed with Sulphon Cyanine Black or Gloria Black N.

b) Dyeing with Benzo Colours which leave the Silk perfectly white or almost white.

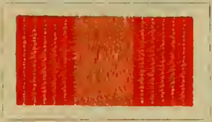
In order to leave the silk white or as white as possible, it is necessary to choose the most suitable colours and to increase the additions of soda and soap.

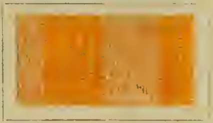
Dye at 140—195° Faht. with an addition of 5—10% olive oil soap, 1—2% soda ash and, if necessary, 5—10% Glauber's salt cryst. If no Glauber's salt is used, the silk in certain cases remains whiter; of course the cotton, too, absorbs considerably less colour then.

This method is especially serviceable for the dyeing of two-coloured effects when the silk is to be subsequently dyed with acid or basic colours.

343

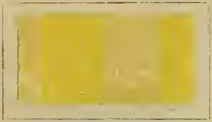
0,5% Benzo Fast Eosine B L

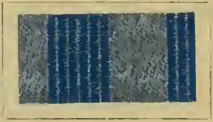
344

2% Benzo Fast Scarlet G S

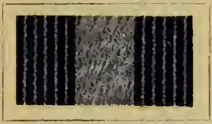
345

2% Benzo Fast Orange 2 R L

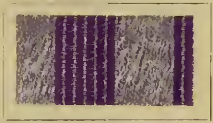
346

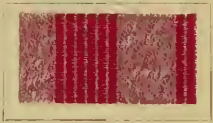
2% Direct Yellow R

347

2% Chloramine Yellow G G

348

2% Benzo Sky Blue

349

3% Diazo Black B H N

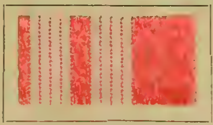
350

2% Brilliant Benzo Violet 2 B H

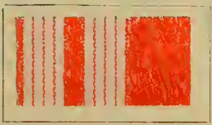
351

2% Benzo Fast Heliotrope 5 R H

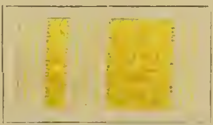
Green shades are obtained by combining Benzo Sky Blue and Direct Yellow R or Chloramine Yellow G G, black shades by combining Diazo Black B H N with Direct Yellow R and, after dyeing, diazotising and developing with Developer H.

c) Dyeing with Acid Colours which only dye the Silk.

Dye at the boil with an addition of 3—5% sulphuric or formic acid. This process, too, is generally adopted for two-coloured effects. The cotton is covered with Benzo colours.

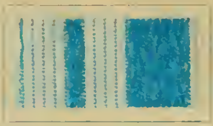
352

0,1% Azo Fuchsine 4 G extra

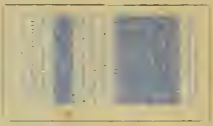
353

0,2% Brilliant Croceine 3 B

354

0,2% Indian Yellow G

355

0,2% Supramine Yellow R

356

0,2% Brilliant Acid Blue A

357

0,2% Alizarine Astrole B

In addition to the colours illustrated above, the following are adapted for this method:

Red:	Alizarine Rubinole R
	Azo Phloxine 2 G
	Croceine Scarlet R
	Rhodamine B, G
Orange:	Orange II B
Yellow:	Fast Light Yellow brands
	Sulphon Yellow 5 G, R
	Tartrazine, R E, S E
Green:	Alkali Fast Green 3 B, 3 G
	Brilliant Acid Green 6 B
	Acid Green brands
Blue:	Alizarine Sky Blue B
	Brilliant Acid Blue brands
	Brilliant Wool Blue F F R extra
	Wool Blue brands
	Wool Fast Blue B L, G L
Violet:	Alizarine Irisole R
	Azo Acid Violet A 2 B
	Fast Acid Violet 10 B
	Acid Violet 4 B extra, B W, 6 B N B.

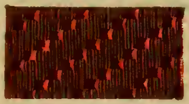
d) Two-coloured Effects.

If the cotton is dyed with Benzo colours, fast to acid, (see b), dye the silk afterwards with acid or basic colours in a fresh, cold bath with an addition of acetic acid (Patterns 338 & 360).

If the silk has been previously dyed with acid colours (see c), mordant the cotton in a cold bath with tannin and tartar emetic and then dye with basic colours.

The Dyeing of Half-silk.

Pleasing effects can be obtained in one bath by combining the Benzo colours illustrated under b) with suitable acid colours which, when worked under the same conditions, dye the silk well without covering the cotton to any great extent. (Patterns 359 & 361).

358

4 % Chloramine Yellow G G
1,5 % Benzo Sky Blue
0,75% Brilliant Croceine 3 B

359

2 % Brilliant Benzo Violet 2 B H
0,6% Brilliant Acid Green 6 B
1,5% Sulphon Yellow 5 G

360

4 % Chloramine Yellow G G
0,5% Alizarine Irisole R

361

3 % Benzo Fast Heliotrope 5 R H
1,5% Sulphon Yellow 5 G

Suitable colours dyeing acid or in a weak acid bath:

Red:	Rhodamine B, G Acid Anthracene Red 3 B
Orange:	Sulphon Orange G
Yellow:	Sulphon Yellow 5 G
Green:	Alkali Fast Green 3 G
Blue:	Alizarine Sky Blue B Brilliant Wool Blue B extra, F F R extra, G extra Wool Blue S R extra Wool Fast Blue B L, G L
Violet:	Alizarine Irisole R Alkali Violet L R Acid Violet 6 B N B Wool Fast Violet B
Grey:	Supramine Black B R.

VI. The Dyeing of Wool-silk.

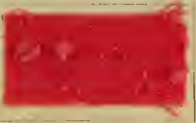
The Dyeing of Wool-silk.

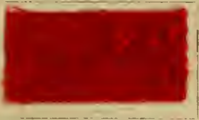
a) Dyeing with Acid and Weakly Acid Colours which cover both Fibres uniformly.

Dye with an addition of 10% Glauber's salt cryst. and 5—15% bisulphate of soda at 195—200° Faht.

When dyeing Acid Anthracene Red 3 B, it is advisable to begin with an addition of 2—3% acetic acid and to add 2—4% bisulphate of soda later on. Sulphon Cyanine G R extra, like the Sulphon Cyanines in general, and Gloria Black N are dyed at 195—200° Faht. with an addition of 10—20% Glauber's salt, a little acetic acid being subsequently added.

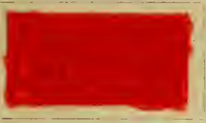
It should be borne in mind that by working at the boil with a little acid, the wool absorbs more colour than the silk, whilst by treating at a lower temperature with much acid, the silk absorbs more colour.

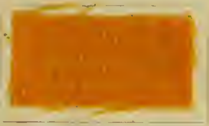
362

1% Alizarine Rubinole R

363

3% Fast Red A

364

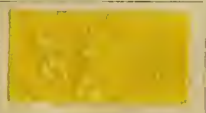
3% Acid Anthracene Red 3 B

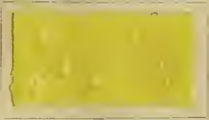
365

3% Brilliant Croceine 3 B

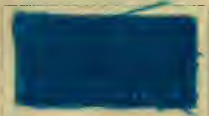
366

3% Indian Yellow G

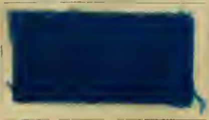
367

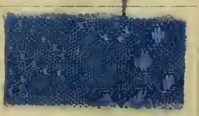
2% Fast Light Yellow G

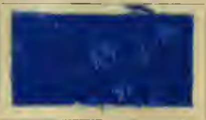
368

2% Supramine Yellow R

369

0,5% Quinoline Yellow K T extra konz.

370

2% Brilliant Acid Green 6 B

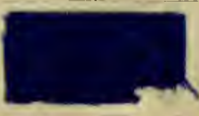
371

2% Brilliant Acid Blue A

372

1% Alizarine Astrole B

373

0,75% Brilliant Wool Blue G extra

374

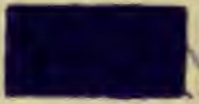
2% Alizarine Sky Blue B

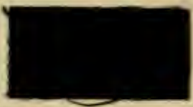
375

2% Wool Blue R extra

376

1,5% Sulphon Cyanine G R extra

The Dyeing of Wool-silk.

377

2% Fast Acid Violet 10 B

378

10% Wool-silk Black 24862

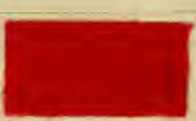
379

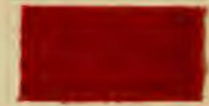
10% Gloria Black N

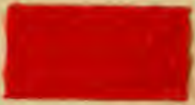
The colours illustrated above are in great favour for the dyeing of self-shades. They may be combined with one another to produce fashion, brown and olive shades; their level-dyeing property is good. Sulphon Cyanine GR extra is used almost exclusively for navy and dark blues. Wool-silk Black 24862 and Gloria Black N are the most popular blacks for wool-silk.

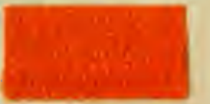
b) Dyeing with Benzo Colours which cover both Fibres uniformly.

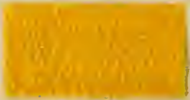
Dye at 195—200° Faht. with an addition of 10—20% Glauber's salt cryst. and, if necessary, 2—4% acetic acid.

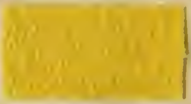
380

3% Benzo Fast Red 8 B L

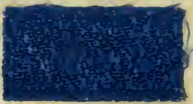
381

3% Benzo Fast Red F C

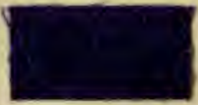
382

3% Benzo Scarlet B C

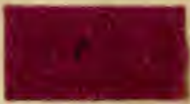
383

3% Benzo Fast Orange S

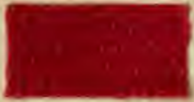
384

3% Chrysophenine G

385

1% Benzo Fast Yellow 4 G L extra

386

1,5% Brilliant Benzo Blue 6 B

387

3% Brilliant Fast Blue B

388

1,5% Benzo Fast Heliotrope B L

389

1,5% Benzo Fast Heliotrope 2 R L

390

3% Toluylene Fast Brown 2 R

The colours may be combined with one another or with the neutral-dyeing wool colours mentioned under "The Dyeing of Half-wool". (The latter are serviceable for shading the silk.)

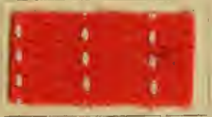
c) Dyeing with Acid and Mordant Colours which leave the Silk white.

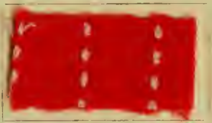
Prepare the dye-bath with 10—20% acetic acid, according to the depth of the required shade, and dye at the boil in a long liquor.

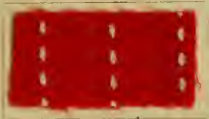
Aftertreat Acid Chrome Blue 2 R and Acid Chrome Black 24968 at the boil for $^3/_1$ hour, in a fresh bath with bichrome (see recipes) and 3—5% acetic acid.

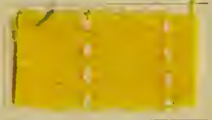
391

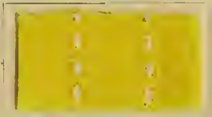
1,5% Azo Fuchsine 6 B

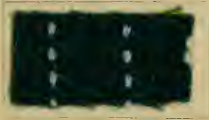
392

1% Alizarine Rubinole 3 G

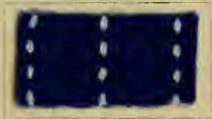
393

1,5% Azo Phloxine 2 G

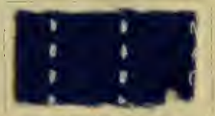
394

1,5% Azo Crimson S

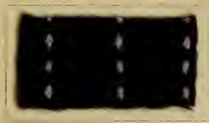
395

1,5% Tartrazine

396

1,5% Fast Light Yellow 3 G

397

1,5% Anthracyanine Green 3 G L

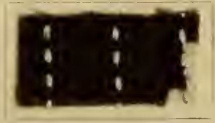
398

1,5% Alizarine Sapphirole B

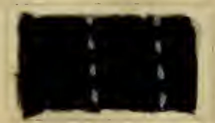
399

2% Anthra Cyanine 4 R L

400

2% Acid Chrome Blue 2 R
1% Bichrome

401

1% Victoria Fast Violet 2 R extra

402

1,5% Anthracyanine Brown G L

403

5 % Acid Chrome Black 24968
2,5% Bichrome

Any fashion, olive or brown shade etc. may be produced by suitable combinations of the above colours. For fashion shades, use combinations of Azo Ploxine 2G or Azo Crimson S, Fast Light Yellow 3G and Alizarine Sapphirole B or Anthra Cyanine 4RL; for olives and browns use the same red colours with Azo Fuchsine 6B, Tartrazine, Anthracyanine Green 3GL or Anthracyanine Brown GL. For strawberry shades fast to light employ Alizarine Rubinole 3G as the red constituent.

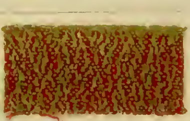
Victoria Fast Violet 2R extra is useful for shading navy blues. Acid Chrome Blue 2R and Acid Chrome Black 24968 are serviceable for men's suitings.

The method is resorted to both for material in which the silk is to remain white and for two-coloured effects.

d) Two-coloured Effects.

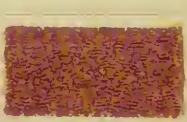
Dye the wool as stated under c), rinse and then cover the silk in a cold bath with basic colours, making an addition of 3—4% acetic acid (patterns 404 & 406) or with Benzo colours, fast to acid, making an addition of 4—6% acetic acid (Patterns 405 & 407).

404



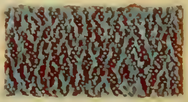
1,5 % Azo Phloxine 2G
1,2 % Auramine II
0,2 % Rhoduline Orange N
0,06% Brilliant Green cryst.

405



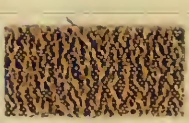
1 % Fast Light Yellow 3G
0,3% Benzo Fast Heliotrope 4BL

406



0,8 % Azo Crimson S
0,6 % Tartrazine
0,08% Anthra Cyanine 4RL
0,1 % Turquoise Blue G

407



0,75% Alizarine Sapphirole B
0,4 % Benzo Fast Orange S

In addition to the Benzo colours illustrated, the following brands (to give a few examples) are suitable for subsequently covering the silk:

Red: Benzo Fast Red GL
Benzo Red 10B
Geranine G

Orange:	Toluylene Fast Orange L X
Yellow:	Chloramine Yellow G G, W extra
Green:	Benzo Green C, F F Brilliant Benzo Green B
Blue:	Benzo Blue 2 B Benzo Fast Blue 5 R Brilliant Azurine B Brilliant Fast Blue B Brilliant Sky Blue G, 5 G Benzo Fast Heliotrope B L, 2 R L.

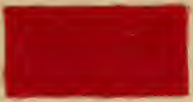
VII. The Dyeing of Fabrics consisting of Wool, Silk and Cotton.

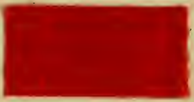
The Dyeing of Fabrics consisting of Wool, Silk and Cotton.

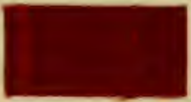
Uniform (Solid) Shades.

It is best to use Benzo colours, if necessary together with neutral-dyeing wool colours.

Prepare the bath, according to the depth of the required shade, with an addition of 10—30% Glauber's salt cryst., enter the material at 120—140° Faht., raise to the boil after 1/4 hour, boil about 10 minutes and continue working with turned-off steam. As a rule, the cotton and silk are sufficiently covered at 160—175° Faht., whilst the wool absorbs the colour better at the boil. Hence it follows that a proper regulation of the temperature is the best means of ensuring uniform (solid) shades.

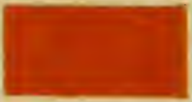
408

1,5% Brilliant Geranine 3 B

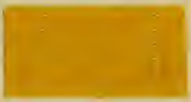
409

3,5% Benzo Purpurine 4 B
0,6% Rhodamine B

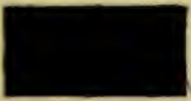
410

3,5% Benzo Fast Red F C

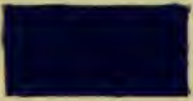
411

4 % Benzo Fast Red F C
2 % Chloramine Violet R
0,25% Acid Violet 4 B extra

412

3,5% Congo Orange G

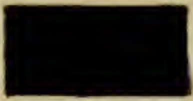
413

3% Chloramine Yellow H W
2% Sulphon Yellow R

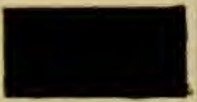
414

3,5% Benzo Green C

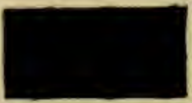
415

2,5 % Brilliant Benzo Blue 6 B
0,75% Brilliant Wool Blue G extra
0,15% Brilliant Acid Blue A

416

3% Benzo Sky Blue
1% Brilliant Azurine R
1% Brilliant Wool Blue G extra

417

2,75% Diazo Black B H N
0,75% Sulphon Cyanine G R extra

418

2,75% Benzo Brown D 3 G extra
0,8 % Diazo Black B H N
0,7 % Wool Fast Blue B L

419

7% Universal Black B

All the above colours may be combined with one another.

VIII. The Dyeing of Woollen Material containing Glanzstoff Effects.

The Dyeing of Woollen Material containing Glanzstoff Effects.

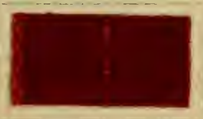
a) Uniform (Solid) Shades.

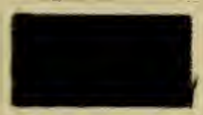
1. Dye with suitable Benzo and wool colours. Prepare the bath with an addition of 30% Glauber's salt cryst., 3% acetic acid and 0,3% bichrome; enter at 140° Faht., raise slowly to the boil and boil gently until both fibres are uniformly covered (Patterns 420 & 421).

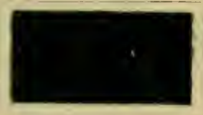
2. Dye with an addition of 30% Glauber's salt cryst. in the way mentioned above (Pattern 422). In the case of pattern 425, 3% acetic acid was added, besides the Glauber's salt.

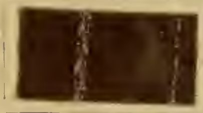
3. First dye the wool with an addition of 15% Glauber's salt cryst. and 5% sulphuric acid, boiling gently; then rinse and cover the artificial silk (Glanzstoff) in a cold bath with Benzo Colours and an addition of 30% Glauber's salt cryst.

4. Another method is to dye the wool in an acid bath, rinse and afterwards mordant with tannin and tartar emetic, rinse again and cover the artificial silk in a cold bath with basic colours, using an addition of acetic acid.

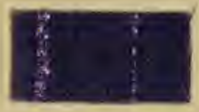
420

2,5% Benzo Red 10 B
0,4% Benzo Fast Violet N C
2 % Cloth Red G

421

4 % Navy Blue for Halfwool B
0,7% Sulphon Cyanine G R extra
0,2% Diazo Black B H N

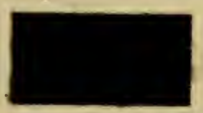
422

3 % Benzo Green F F
0,6% Brilliant Acid Blue A
0,5% Fast Light Yellow G
0,2% Sulphon Cyanine G R extra

423

0,75% Anthracyanine Brown G L

0,02% Benzo Fast Red L
0,17% Pluto Brown G G
0,09% Benzo Fast Black

424

0,5 % Anthracyanine Violet 3 B

0,12% Brilliant Benzo Violet B
0,06% Benzo Fast Black

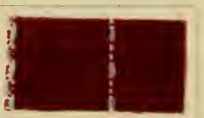
425

5% Naphtylamine Black 4 B L
5% Glanzstoff Black 25204

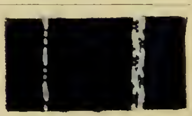
b) White and Coloured Glanzstoff Effects.

1. In order to leave the artificial silk white, dye with an addition of 15% Glauber's salt cryst and 5% sulphuric or formic acid, boiling gently (Patterns 426—428).

2. To produce two-coloured effects, dye the wool as described above; rinse and then cover the artificial silk in a cold bath with Benzo colours, making an addition of 30% Glauber's salt cryst. (patterns 429—431).

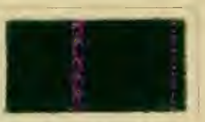
3. Two-coloured effects may also be obtained by dyeing the wool in an acid bath, afterwards treating with tannin and then covering the artificial silk with basic colours (See a, 4).

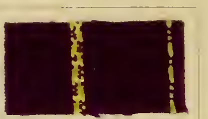
426

2,75% Azo Fuchsine 4 G extra
0,4 % Anthra Cyanine 4 R L

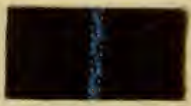
427

3% Anthra Cyanine R L

428

5% Naphtylamine Black 4 B L

429

2 % Anthracyanine Green 3 G L
0,3% Tartrazine
0,3% Benzo Fast Heliotrope B L

430

2 % Wool Fast Violet B
0,75% Benzo Fast Yellow 4 G L extra

431

2,5% Anthracyanine Brown G L
0,5% Brilliant Benzo Blue 6 B

IX. The Dyeing of Cotton Material containing Artificial Silk Effects.

The Dyeing of Cotton Material containing Artificial Silk Effects.

a) Cotton Material with Glanzstoff Effects.

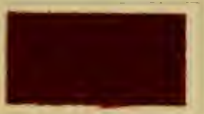
Dye with an addition of 15% Glauber's salt cryst., 2% olive oil soap and 0.5% soda ash. In the case of light shades, add only 5% Glauber's salt cryst. at the commencement, adding the remaining 10% in two portions later on.

Enter at 85—105° Faht., work for some time at this temperature, slowly warm up to 120—160° Faht., according to the depth of the required shade, and work until the cotton is sufficiently covered.

As any excess of Glauber's salt or too high a temperature causes the colour to go on to the artificial silk rather than the cotton, it is advisable to test the shade several times by taking a pattern and, if the artificial silk is dyed the same depth as the cotton, to allow the temperature to sink. In order to obtain a deep black, the shade must be diazotised and developed (see pattern 435).

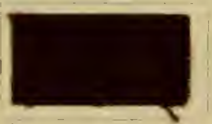
A very concentrated bath is necessary in the case of deep shades.

432



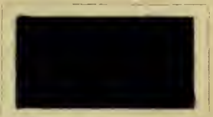
5 % Benzo Fast Red G L
0,6% Brilliant Azurine R

433



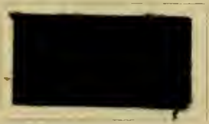
8% Benzo Chrome Brown C R
3% Benzo Fast Orange S

434



12% Brilliant Azurine R
8% Brilliant Benzo Blue 6 B
2% Benzo Fast Orange S

435



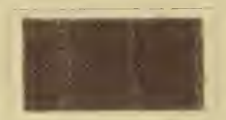
5,5 % Diazo Fast Black S D
2,5 % Diazo Olive G
0,75% Dev. A
0,75% Dev. H

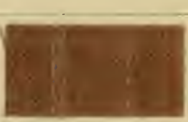
In addition to the colours illustrated above, the following are adapted for dyeing cotton with Glanzstoff effects:

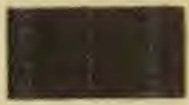
Red:	Benzo Fast Scarlet 8 B S, G S	Blue:	Benzo Steel Blue G extra Brilliant Fast Blue B
Orange:	Benzo Fast Orange W S Chloramine Orange G	Violet:	Chloramine Violet R
Yellow:	Direct Yellow R, R extra Thiazole Yellow 3 G	Brown:	Benzo Brown R C Chloramine Brown G
Blue:	Benzo Sky Blue	Grey and Black:	Pluto Black L extra.

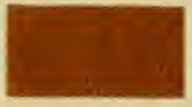
b) Cotton Material with Chardonnet Silk Effects.

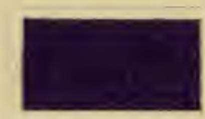
Dye as stated under a).

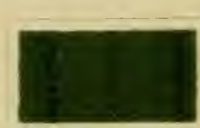
436

0,05% Benzo Fast Scarlet 4 B S
0,1 % Chloramine Yellow M
0,3 % Pluto Black L extra

437

0,1% Benzo Fast Scarlet 4 B S
0,4% Chloramine Yellow M
0,2% Pluto Black L extra

438

0,03% Benzo Fast Scarlet 4 B S
0,2 % Chloramine Yellow M
0,6 % Pluto Black L extra

439

5 % Chloramine Yellow M
0,35% Benzo Fast Scarlet 4 B S
0,4 % Benzo Chrome Brown C R

440

7 % Chloramine Violet R
1,5% Brilliant Azurine R

441

5% Chloramine Yellow M
5% Benzo Green G

The following colours are also suitable:

Red: Benzo Fast Scarlet 8 B S, G S
Benzo Fast Red 8 B L
Benzo Fast Rubine B L

Orange: Chloramine Orange G
Toluylene Fast Orange L X

Yellow: Direct Yellow R, R extra
Chloramine Yellow H W
Thiazole Yellow 3 G

Blue: Brilliant Azurine 5 G
Brilliant Fast Blue B, 3 B X

Brown: Benzo Brown 3 G C, R C
Benzo Chrome Brown G
Chloramine Brown G
Toluylene Fast Brown 3 G

Black: Diazo Fast Black S D
(Devs. A & F, A & H, F).

X. The Dyeing of Half-woollen Material containing Artificial Silk Effects.

The Dyeing of Half-woollen Material containing Artificial Silk Effects.

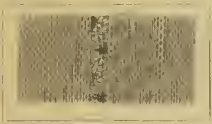
1. Dye the wool with acid colours, employing an addition of 10% Glauber's salt cryst. and 3—4% formic acid, rinse well (with a little soda, if necessary) and cover the cotton and artificial silk in a fresh, cold bath with Benzo colours, making an addition of 20—50% Glauber's salt cryst and 0.5—1% soda ash. (If the artificial silk remains too light, raise the temperature carefully to 105° Faht.).

2. Dye the wool as stated under 1, rinse, mordant with tannin and tartar emetic and cover the cotton and artificial silk in a cold bath with suitable basic colours, using an addition of acetic acid.

3. Dye with Benzo colours and, if necessary, with neutral-dyeing wool colours, making an addition of 20—40% Glauber's salt cryst. Enter at 120° Faht, treat for about 1/2 hour, warm up to about 195° Faht. and continue boiling for 1/2 hour. (If the wool is not dyed deep enough, boil for a short time.)

(Two-coloured effects may also be produced according to recipes 1 and 2.)

442



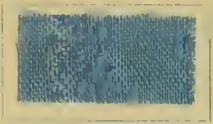
0,08% Anthracyanine Grey G L

0,03% Diazo Fast Black S D

0,02% Benzo Brown 2 G C

0,01% Benzo Fast Yellow 4 G L extra

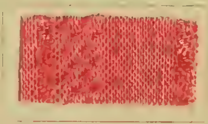
443



0,15% Alizarine Uranole R

0,08% Brilliant Benzo Blue 6 B

444



0,25% Benzo Fast Eosine B L

0,35% Alizarine Rubinole R

445

10% Universal Black B

Almost all the acid level-dyeing colours are adapted for methods 1 and 2. In the case of two-coloured effects, use those wool colours which leave the cotton and artificial silk white.

For Benzo colours suitable for Method 1, see chapter entitled "The Dyeing of Cotton Material containing Artificial Silk Effects".

The basic colours most suitable for method 2 are:

Red:	Rhodamine B, G Saffranine F F extra

The Dyeing of Half-woollen Material containing Artificial Silk Effects.

Orange:	Rhoduline Orange N
Yellow:	Rhoduline Yellow 6 G
Blue:	Cotton Blue II
	Indone Blue B B
	New Victoria Blue B
Violet:	Brilliant Rhoduline Purple R
	Methyl Violet B, 7 B
Grey:	New Fast Grey.

The Benzo colours most suitable for method 3 are:

Red:	Benzo Fast Red 8 B L, 9 B L
	Benzo Fast Scarlet 4 B S, 8 B S
	Benzo Fast Eosine B L
	Geranine G
Yellow:	Benzo Fast Yellow 4 G L extra
	Thiazole Yellow 3 G
Blue:	Benzo Steel Blue G extra
	Brilliant Azurine R
	Brilliant Benzo Blue 6 B
Violet:	Benzo Fast Heliotrope B L
Brown:	Benzo Brown 3 G C
Grey and Black:	Benzo Fast Black L
	Direct Deep Black G
	Black for Artificial Silk 26 178
	Universal Black B

(For suitable neutral-dyeing wool colours, see chapter on the dyeing of half-wool, c.)

XI. The Dyeing of Artificial Silk.

Glanzstoff, Viscose and Chardonnet Silk.

Glanzstoff and Viscose behave in almost the same way during the dyeing operation and, on the whole, display more affinity for Benzo colours than Chardonnet silk.

When dyeing with basic colours, Glanzstoff and Viscose must be previously mordanted with tannin and tartar emetic, whereas Chardonnet silk may be dyed direct.

However, by previously mordanting Chordonnet silk with tannin and tartar emetic, considerably fuller shades of better fastness to light, water and rubbing are obtained.

Chardonnet silk is also sold under the names Tubize, Besançon, Nitro silk etc.

The dyeing of Glanzstoff, Viscose and Chardonnet silk with Benzo colours. In the case of light shades, prepare the bath with an addition of 10% Glauber's salt cryst. and 1—2% Monopole Soap: 1% soda ash may also be added, especially when using hard water. In the case of dark shades, dye with an addition of 30—40% Glauber's salt cryst., 2% Monopole Soap and, if necessary, 1% soda ash. *) Brilliant Sky Blue G, 5G & R are worked with Glauber's salt and 2—3% acetic acid.

Enter the material at about 85° Faht., warm slowly up to 140—150° Faht., and work for 1/2—1 hour. In the case of dark shades, a higher temperature may be applied and some more Glauber's salt subsequently added; in this way the bath exhausts better.

The dyeing of Glanzstoff and Viscose with basic colours. Before being dyed, the material is mordanted with tannic acid and tartar emetic. Enter into a warm bath of 120—140° Faht. and add 2—4% tannic acid; 0.5—1% hydrochloric acid may also be added. Work for a short time and then immerse the material for 2—3 hours, turning from time to time. Finally, turn again a few times, lift out, hydroextract, squeeze out and afterwards treat for 20—30 minutes in a fresh, cold bath with 1—2% tartar emetic.

The dyeing is carried out with an addition of 3—6% acetic acid or a corresponding amount of formic acid. Enter at the ordinary temperature, add the colour in several portions and finally warm up to about 120° Faht.

The dyeing of Chardonnet silk with basic colours. Dye direct with an addition of acetic or formic acid, as stated for Glanzstoff.

As mentioned above, full shades may also be dyed on a tannin mordant; the process is then the same as in the case of Glanzstoff.

The most important Benzo Colours for Glanzstoff and Viscose are:

Red: Benzo Bordeaux 6 B
Benzo Fast Red 6 B L, 8 B L, F C, G L
Benzo Fast Scarlet 4 B S, 8 B S, G S
Benzo Fast Bordeaux 6 B L
Benzo Fast Eosine B L
Benzo Fast Rubine B L
Benzo Purpurine B, 4 B
Benzo Rhoduline Red B
Benzo Rubine S C
Brilliant Congo R
Brilliant Geranine 2 B N
Chloramine Red 8 B S
Congo Rubine

Orange: Benzo Fast Orange S, W S
Pluto Orange G
Toluylene Fast Orange G L, L X

Yellow: Benzo Fast Yellow 4 G L extra, R L
Brilliant Pure Yellow 6 G extra
Chloramine Yellow M
Chrysophenine G
Thiazole Yellow 3 G
Toluylene Yellow G

Green: Benzo Dark Green B, G G
Benzo Green C, F F G
Benzo Olive
Brilliant Benzo Green B

Blue: Benzo Blue 3 B, R W
Benzo Fast Blue B N, F F L

Blue: Benzo New Blue 2 B, 5 B
Benzo Steel Blue G extra
Brilliant Azurine B
Brilliant Benzo Blue 6 B
Brilliant Fast Blue B, 3 B X
* Brilliant Sky Blue G, 5 G, R
Diazo Black B H N

Violet: Benzo Fast Violet N C
Benzo Violet R L extra
Benzo Fast Heliotrope B L, 4 B L, 2 R L, 5 R H
Brilliant Benzo Violet B, 2 B H, 2 R

Brown: Benzo Brown 2 G C, 3 G C, C B
Benzo Bronze G C
Benzo Chrome Brown 5 G
Pluto Brown R
Toluylene Fast Brown 3 G, 2 R

Grey and Black: Benzo Black H W
Benzo Deep Black S S
Benzo Fast Black
Diazo Fast Black S D
Direct Deep Black E extra, R W extra
Glanzstoff Black 25204, 25827
Black for Artificial Silk 26178.

The most important Benzo colours for Chardonnet silk are:

Red: Benzo Bordeaux 6 B
Benzo Fast Red F C, G L
Benzo Fast Eosine B L

Red: Benzo Purpurine B, 4 B
Benzo Rhoduline Red B
Brilliant Congo R

Red: Brilliant Geranine 2 B N
Chloramine Red 8 B S
Congo Rubine

Orange: Benzo Fast Orange S, W S
Pluto Orange G

Yellow: Benzo Fast Yellow R L
Chloramine Yellow M
Chrysophenine G
Thiazole Yellow 3 G
Toluylene Yellow G

Green: Benzo Dark Green B, G G
Benzo Green C, F F G
Benzo Olive
Brilliant Benzo Green B

Blue: Benzo Blue 3 B, R W
Benzo Fast Blue B N, F F L
Benzo New Blue 2 B
Benzo Steel Blue G extra
Brilliant Azurine B
Brilliant Benzo Blue 6 B

Blue: Brilliant Fast Blue B, 3 B X
* Brilliant Sky Blue G
Diazo Black B H N

Violet: Benzo Fast Violet N C
Benzo Violet R L extra
Benzo Fast Heliotrope B L, 4 B L, 2 R L, 5 R H
Brilliant Benzo Violet B, 2 B H, 2 R

Brown: Benzo Brown 2 G C
Benzo Bronze G C
Benzo Chrome Brown 5 G
Pluto Brown R
Toluylene Fast Brown 3 G, 2 R

Grey and Black: Benzo Fast Black
Diazo Fast Black S D
Glanzstoff Black 25827
Black for Artificial Silk 26178.

Basic Colours which are suitable for dyeing Glanzstoff, Viscose and Chardonnet Silk.

All the basic colours are suitable; the following are the principal ones:

Red: Brilliant Rhoduline Red B
Diamond Fuchsine cryst.
Rhoduline Red G
Saffranine F F extra

Yellow: Auramine II
Rhoduline Yellow 6 G, T

Green: Brilliant Green extra cryst.

Blue: New Victoria Blue B

Blue: Turquoise Blue B B, G
Victoria Blue B

Violet: Crystal Violet P
Methyl Violet B, 5 B
Rhoduline Heliotrope B

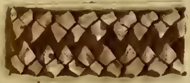
Grey and Black: New Fast Grey
Nitron Black B.

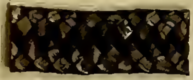
Other Materials.

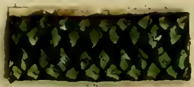
XII. The Dyeing of Straw.

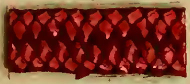
To obtain level results on straw, a prolonged boiling is necessary. As a rule, the dyeing operation lasts 3 hours. It is therefore advisable to soften the straw beforehand by steeping it in hot water for a day. The dyeing is chiefly (at least in the case of dark shades) carried out with basic colours. Of the basic colours, however, only those which penetrate the plait well are suitable. A few basic colours, such as Bismarck Brown and Methyl Violet are unsuitable because they leave the covered parts white.

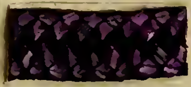
For light shades and bright reds, acid colours, dyed with an addition of acetic acid, are also adapted. Black shades are sometimes dyed with Straw Black 22395, a basic colour. A softer and more pleasing black, however, is obtained with Direct Deep Black E extra 24926 (use 6% colour and 0.5% soda ash, and boil for 6 hours) and a better black still with Diazo Fast Black S D (4—5% colour, 0.5% soda ash, boil for 4—5 hours). After the dyeing operation, the goods must be rinsed well.

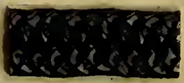
446

0,1% New Blue R extra

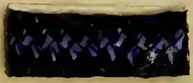
447

1 % Chrysoidine G conc.
0,05% New Magenta
0,3 % Methylene Green B

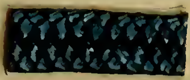
448

1,5% Coriphosphine O X
0,5% Methylene Green B

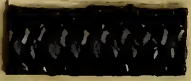
449

2% Leather Red R

450

1,8% Rhoduline Violet
0,2% Methylene Blue B B

451

6% Direct Deep Black E extra 24926

452

2% Navy Blue extra

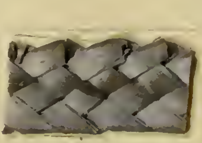
453

2% Methylene Green B

454

2 % New Blue R extra
0,5% Rhoduline Violet
0,5% Methylene Blue B B

XIII. The Dyeing of Chip Plait.

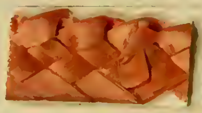
Basic, as well as acid and substantive colours are employed. Use the same basic colours as are suitable for dyeing straw. Dye, without previously soaking the material, for 1 hour at the boil, using an addition of acetic acid in the case of basic and acid colours, Glauber's salt in the case of substantive colours, and Glauber's salt and soda for black. Rinse well, even after using acid colours.

455



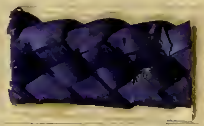
0,25% Benzo Fast Black

456



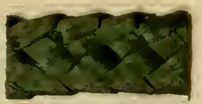
4% Benzo Purpurine 4 B

457



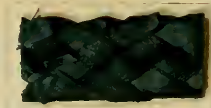
2 % Wool Fast Blue B L
0,7% Wool Blue R extra
0,3% Alkali Violet L R

458



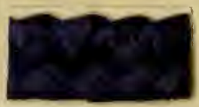
1,5% Coriphosphine O X
0,1% New Blue R extra
0,6% Methylene Green B

459



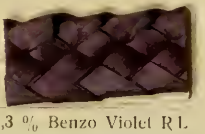
3% Benzo Dark Green G G

460



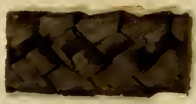
3% Navy Blue extra

461



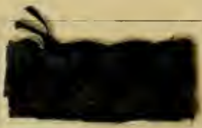
1,3 % Benzo Violet R L extra
0,36% Benzo Fast Black
0,31% Chrysophenine G

462



1,08% Benzo Fast Black
0,44% Congo Rubine
2,68% Chrysophenine G

463



4% Direct Deep Black E extra

XIV. The Dyeing of Jute.

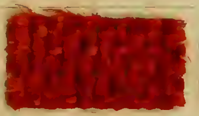
Dye acid colours with an addition of 1—4% alum; after dyeing do not rinse.

Dye substantive colours with an addition of 5—20% Glauber's salt cryst.; in the case of black shades, use 10% Glauber's salt cryst. and 2% soda ash.

Enter at the boil and dye for 1 hour with turned-off steam.

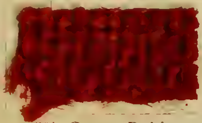
Katigen colours are dyed exactly as in the case of cotton. (See our special card, No. 1631, 1909.)

464



3% Brilliant Red 23407

465



3% Congo Rubine

466

2% Pluto Brown G G

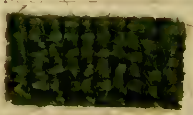
467

1,75% Chrysophenine G
0,25% Wool Fast Blue GL

468

1,4% Chrysophenine G
0,2% Benzo Fast Orange S
0,4% Wool Fast Blue G L

469



1,5% Chrysophenine G
0,5% Benzo Dark Green G G

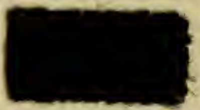
470

2% Benzo Dark Green G G

471

2% Wool Fast Blue B L

472



2,5 Direct Deep Black E extra

XV. The Dyeing of Linen, Half-linen and Ramie (China Grass).

Before dyeing, linen must be boiled with 5—10% soda.

As a rule, the above fibres are dyed in exactly the same way as cotton except that in the case of linen and half-linen, up to 2% Monopole Soap is added and the Glauber's salt used only after working for $^1/_2$ hour, in order to further the penetration and level-dyeing. When dyeing light shades, an addition of Glauber's salt is, in most cases, unnecessary.

XVI. The Dyeing of Feathers.

Ostrich feathers are dyed fancy shades with basic colours in an acetic acid bath. Black shades are dyed with logwood and iron in combination with Feather Black 26042.

Goose feathers etc. are dyed with 15—20% Feather Black 26042 and 8% sulphuric acid; for fancy shades, acid colours which dye easily level are employed.

Note: The quantities of colour given refer to the first bath.

— Without guarantee. —